Michigan Department of Health and Human Services

HL7 Version 2.5.1 Implementation Guide: Lab Orders – Bureau of Laboratories

FOR PILOT AND TRIAL IMPLEMENTATIONS ONLY

This Implementation Guide is being released for Pilot and Trial implementations ONLY. Changes are expected prior to final release for general implementations.

Version 0.9

MDHHS
Michigan Department of Health & Human Services

MDHHS
Bureau of Laboratories

Table of Contents

List of Tables

1. Introduction

As the health care community moves to an electronic and interoperable environment, the health care community desires to send lab orders from the provider Electronic Health Records (EHR) system and receive lab results from the Michigan Department of Health and Human Services (MDHHS) Bureau of Laboratories (BOL) systems via the Michigan HIE platform. In order to streamline interoperability, MDHHS has adopted the Office of the National Coordinator's (ONC), Standards and Interoperability Framework Initiative (S&I Framework) Laboratory Orders Interface Implementation Guide with the following selected profiles.

- LOI_Common_Component
- LOI_NG_Component (Non-Globally Unique)
- LAB_PRN_Component (Non-Unique Placer Order Number)
- LAB_FRU_Component (Unique Filler Order Number)
- LAB_FI_COMPONENT (Financial Information)
- LOI_PH_COMPONENT (Public Health)
- LOI_PR_COMPONENT (Prior Results)
- LAB_TO_COMPONENT (Time Offset)

In addition to those profiles there are some Michigan specific items. These include:

- Date/Time of Birth (PID-7) is modified to data type TS-5 and shall include year, month, and day and may include hours, minutes, and seconds.
- Species Code (PID-35) and Breed Code (PID-36) are not supported; HL7 order and result is limited to human testing.
- BOL will ignore Result Handling (OBR-49) and always send results to all orders.
- The incoming order message, ORC-21.10, must include the Ordering Facility's StarLIMS Agency ID, and the related Assigning Authority (ORC-21.6) must indicate StarLIMS Agency ID. See Table 17 - ORC – Common Order Segment.
- BOL does not support the Test Code Details (TCD) segment.
- The required use of Reason for Study (OBR-31) is to capture the primary reason for testing, such as diagnosis, surveillance, or outbreak. Note, this is a locally defined value set, see Table 47 - BOL Table 0001 - Reason for Study for details. The most current Table 51 – BOL Table 0001 may be found on the Laboratory Services Guide website at http://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_5103_26138-362966--,00.html
- The use of Release Information Code (IN1-27) is to indicate confidential testing, see Section 3.1.6.
- Inclusion of IN2 is used for sending the Medicaid beneficiary ID.
- Cancelling and appending an order is only supported before the specimen has been sent. After that, orders can only be changed or cancelled by contacting the lab directly. See Section 3.1
- Includes Michigan HIE platform-related routing requirements. See Section 3.3 and 4.2.
- Several of the tests require Ask at Order Entry responses. See Section 3.1.2.
- Modification of XCN (Extended Composite ID Number and Name for Persons) data type to require the 1 and 2 components for all uses of that data type is contained in this guide. See Section "XCN – Extended Composite ID Number and Name for Persons".

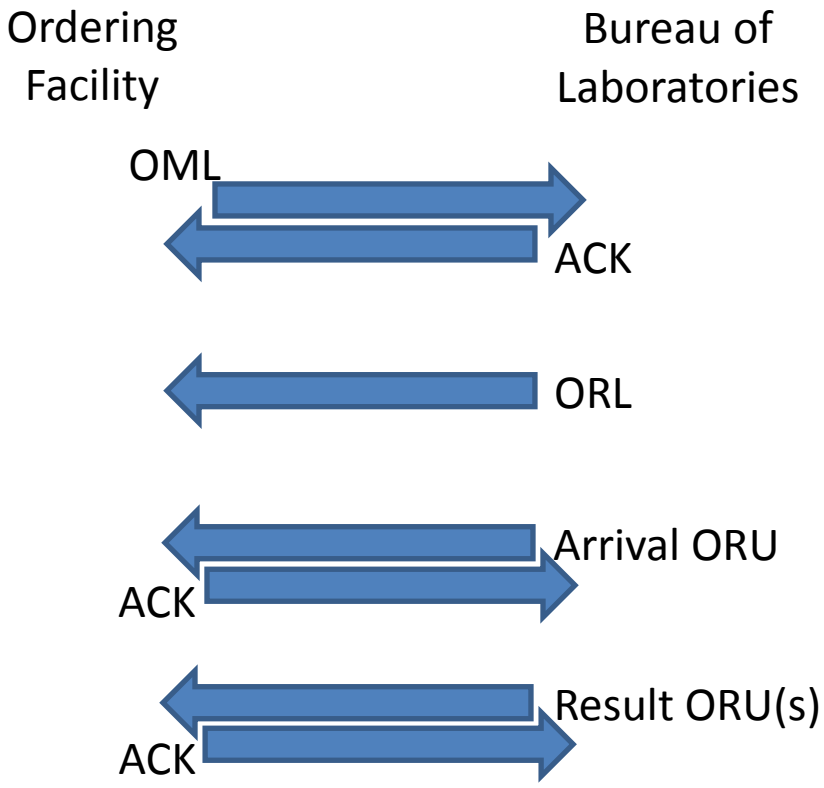
The document that follows is largely a copy of the S&I Framework Laboratory Orders Interface Implementation Guide adjusted for the selected profiles and Michigan-specific items. It also includes on-boarding and testing instructions along with special cases and Michigan HIE platform-related items.

NOTE: Although the S&I Framework Laboratory Orders Interface Implementation Guide is written in HL7 version 2.5.1, several items have been pre-adopted from versions 2.7.1 and 2.8.1. These pre-adopted items are noted throughout this guide.

This document takes advantage of in-document linking for easy navigation. For example: "See Table 47 - BOL Table 0001 - Reason for Study for details." the "Table 51 - BOL Table 0001 - Reason for Study" text links to the corresponding table.

1.1.Basic Message Flow

The message flow starts with an Order (OML) message from the ordering facility. The OML receives an in-session, real-time Acknowledgment (ACK) from the MDHHS Data Hub. The ACK may include any errors in OML for message structure or validation errors. Assuming the OML is acceptable (does not receive an MSA-1of '`AR`'), the next message is an Order Acceptance or Rejection (ORL) message from the Bureau of Laboratories. Assuming the OML is accepted, the next message will be a Specimen Arrival (Arrival ORU) message from the Bureau of Laboratories once the specimen arrives at the testing laboratory. The last messages would be the Results (Results ORU) message from the Bureau of Laboratories. There may be pending, final and corrected Results ORUs. Both the Arrival ORU and any Results ORU(s) must be acknowledged by the receiving system at the ordering facility.



1.2.Audience

This guide is designed for use by analysts and developers who require guidance on data elements and components of the *HL7 Version 2.5.1 OML Laboratory Order Message* relative to the Laboratory Orders Interface with BOL. Users of this guide must be familiar with the details of HL7 message construction and processing. This guide is not intended to be a tutorial on that subject.

1.2.1. Requisite Knowledge

- HL7 V2.5.1, V2.7, V2.7.1 Messaging (www.HL7.org)
- SNOMED (http://browser.ihtsdotools.org/?)
- LOINC (http://loinc.org)
- OIDS (http://www.hl7.org/oid)
- Standards and Interoperability (S&I) Laboratory Results Interface Use Case, Laboratory Results

1.3.Organization of this Guide

1.3.1. Conventions

This guide adheres to the following conventions:

- The guide is constructed assuming the implementer has access to the 2.5.1 and 2.7.1 versions of the HL7 Standard. Although some information from the standard is included in this implementation guide, much information from the standard has not been repeated here.
- The rules outlined in HL7 2.7.1, Chapter 2B, Section 2B5, Conformance Using Message Profiles, were used to document the use case for, and constraints applied to, the messages described in this guide.
- Data types have been described separately from the fields that use the data types.
- No conformance information is provided for fully optional message elements and segments (“O”) or unsupported message elements and segments (“X”). This includes cardinality, value sets, and descriptive information. Implementers who want to use optional message elements should refer to the base HL7 V2.5.1 Standard to determine how these optional message elements will be used. Conformance information is provided when a conditional predicate resolves to an “R” or “RE” on either the “a” or “b” part of the expression, regardless of the opposite value, e.g., C(R/O).
- This guide provides conditional predicates for some fields; note that the condition may be dependent on data elements that are marked as “O” (optional). In these cases, the interpretation by the reader should be “if the optional element is used, then these additional constraints are now required.” That is, if the optional element is present, then these additional constraints are now active. This guidance is included as it is logically true, but these conditional elements are not tested.
- This guide uses “X” as a conformance usage indicator very sparingly. Where the underlying standard indicates the segments/field/component is present for backwards compatibility (“B”) or withdrawn ("W"), an “X” will be used. A small number of other message elements that are clearly out of scope for the use case have been given the "X" usage. All other message elements have either been further constrained to R/RE/C (a/b) or have been left as "O" to enable trading partners to explore additional capabilities. Note that without a clearly agreed to complementary profile between trading partners, an EHR that is compliant with this implementation guide does not have to send any elements marked as an "O", nor does a receiver of a lab order that is compliant with this implementation guide have to process any elements marked as an "O". Neither trading partner can mandate the other to accept any such complementary profiles to enable basic laboratory orders interfacing "out-

of-the-box".

1.3.2. Message Element Attributes

The following table describes the various attributes used by this guide to document data type attribute tables, message structure attribute tables, and segment attribute tables. Not all attributes apply to all attribute tables.

Table 1 - Message Element Attributes

Attribute	Definition
SEQ	Sequence of the elements as numbered in the HL7 message element. The SEQ attribute applies to the data type attribute table and the segment attribute table.
Component Name	Short name for the component.
Segment	Three-character code for the segment and the abstract syntax (e.g., the square and curly braces). [XXX] Optional and singular { XXX } Required and may repeat XXX Required and singular [{ XXX }]Optional and may repeat Note that for segment groups there is no segment code present, but the square and curly braces will still be present. The Segment attribute only applies to the Message attribute table.
DT	Data type used by this profile for HL7 element. The data type attribute applies to data type attribute tables and segment attribute tables.
Usage	Usage of the message element for this profile. Indicates whether the message element (segment, segment group, field, component, or subcomponent) is R, RE, O, X or C(a/b) in the corresponding message element. Usage applies to the message attribute table, data type attribute table, and the segment attribute table.
Cardinality	Minimum and maximum number of times the element may appear. [0..0] Element never present. [0..1] Element may be omitted and can have, at most, one occurrence. [1..1] Element must have exactly one occurrence. [0..n] Element may be omitted or may repeat up to “n” times. [1..n] Element must appear at least once, and may repeat up to “n” times. [0..*] Element may be omitted or repeat an unlimited number of times. [1..*] Element must appear at least once, and may repeat unlimited number of times. [m..n] Element must appear at least “m”, and at most, “n” times. Cardinality applies only to message attribute tables and segment attribute tables.
Value Set	The set of coded values to be used with the field. The value set attribute applies only to the data type attribute tables and the segment attribute tables. The value set may equate with an entire code system, part of a code system, or codes drawn from multiple code systems. Unconstrained, Constrained, and User Defined tables are listed or included in Section 5 Code Systems and Value Sets.
Name	HL7 descriptor of the message element. Name applies to the message attribute table, data type attribute table and the segment attribute table.
Description/Comments	Context and usage for the element. Description/Comments applies to the message attribute table, data type attribute table, and the segment attribute table.

1.3.3. Keywords

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in RFC 2119[1]. The following definitions are excerpted from the RFC:

- **MUST** or the terms "**REQUIRED**" or "**SHALL**", mean that the definition is an absolute requirement of the specification.
- **MUST NOT** or the phrase "**SHALL NOT**", mean that the definition is an absolute prohibition of the specification.
- **SHOULD** or the adjective "**RECOMMENDED**", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- **SHOULD NOT** or the phrase "**NOT RECOMMENDED**" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- **MAY** or the adjective "**OPTIONAL**", mean that an item is truly optional. One software supplier may choose to include the item to enable certain capabilities while another software supplier may omit the same item. In either case, the communication partner cannot be expected to either provide it (sender) or process it (receiver) without clear and voluntary agreement between the partners.

An implementation which does not include a particular segment/field/component marked as optional **MUST** be prepared to interoperate with another implementation which does include the optional segment/field/component, though perhaps with reduced functionality. In the same vein an implementation that includes a particular segment/field/component marked as optional **MUST** be prepared to interoperate with another implementation that does not include the optional segment/field/component.

1.3.4. Usage Conformance Testing Recommendations

The following text is pre-adopted from the HL7 V2.7.1 Conformance (Chapter 2B, 2.B.7.5). Please refer to the base standard documentation for a full explanation of conformance concepts. Usage is described here as it introduces the revised approach to conditional element handling.

---------- *start citation*---------

2.B.7.5 USAGE

Message content is governed by the cardinality specification associated (explicitly or implicitly) with each element of an HL7 message. Usage rules govern the expected behavior of the sending application and receiving application with respect to the element. The usage codes expand/clarify the optionality codes defined in the HL7 standard. Usage codes are employed in a message profile to constrain the use of elements defined in the standard. The usage code definitions are given from a sender and receiver perspective and specify implementation and operational requirements.

The standard allows broad flexibility for the message structures that HL7 applications must be able to receive without failing. But while the standard allows that messages may be missing data elements or may contain extra

[1] http://www.ietf.org/rfc/rfc2119.txt

data elements, it should not be inferred from this requirement that such messages are conformant. In fact, the usage codes specified in a message profile place strict conformance requirements on the behavior of the application.

DEFINITION OF CONDITIONAL USAGE

The conditional usage is defined as follows:

C(a/b) - "a" and "b" in the expression are placeholders for usage codes representing the true ("a") predicate outcome and the false ("b") predicate outcome of the condition. The condition is expressed by a conditional predicate associated with the element ("See section 2.b.7.9, "Condition predicate"). "a" and "b" shall be one of "R", "RE", "O" and/or "X". The values of "a" and "b" can be the same.

The example C(R/RE) is interpreted as follows. If the condition predicate associated with the element is true, then the usage for the element is R-Required. If the condition predicate associated with the element is false, then the usage for the element is RE-Required but may be empty.

There are cases where it is appropriate to value "a" and "b" the same. For example, the base standard defines the usage of an element as "C" and the condition predicate is dependent on the presence or non-presence of another element. The profile may constrain the element that the condition is dependent on to X; in such a case the condition should always evaluate to false. Therefore, the condition is profiled to C(X/X) since the desired effect is for the element to be not supported. Note it is not appropriate to profile the element to X since this breaks the rules of allowable usage profiling (see table HL7 Optionality and Conformance Usage).

Usage Rules for a Sending Application

Optionality /Usage Indicator	**Description**	**Implementation Requirement**	**Operational Requirement**
R	Required	The application shall implement "R" elements.	The application shall populate "R" elements with a non-empty value.
RE	Required but may be empty	The application shall implement "RE" elements.	The application shall populate "RE" elements with a non-empty value if there is relevant data. The term "relevant" has a confounding interpretation in this definition[2].

[2] There are multiple interpretations of "RE" when a value is known. One is "the capability must always be supported, and a value is sent if known"; the other is "the capability must always be supported, and a value may or may not be sent even when known based on a condition external to the profile specification. The condition may be noted in the profile but cannot be processed automatically". This is what can be interpreted from the "relevant" part of the definition. Regardless of the interpretation of the "RE" usage code, a set of test circumstances can be developed to sufficiently test the "RE" element. See the "Conformity Assessment of Conformance Constructs" section for more details.

C(a/b)	Conditional	An element with a conditional usage code has an associated condition predicate (See section 2.B.7.9, "Condition predicate" that determines the operational requirements (usage code) of the element. If the condition predicate associated with the element is true, follow the rules for ***a*** which shall be one of "R", "RE", "O" or X": If the condition predicate associated with the element is false, follow the rules for ***b*** which shall be one of "R", "RE", "O" or X". ***a*** and ***b*** can be valued the same.	
X	Not supported	The application (or as configured) shall not implement "X" elements.	The application shall not populate "X" elements.
O	Optional	None. The usage indicator for this element has not yet been defined. For an implementation profile, all optional elements must be profiled to R, RE, C(a/b), or X.	Not Applicable.

Usage Rules for a Receiving Application

Optionality /Usage Indicator	**Description**	**Implementation Requirement**	**Operational Requirement**
R	Required	The application shall implement "R" elements.	The receiving application shall process (save/print/archive/etc.) the information conveyed by a required element. A receiving application shall raise an exception due to the absence of a required element. A receiving application shall not raise an error due to the presence of a required element,
RE	Required but may be empty	The application shall implement "RE" elements.	The receiving application shall process (save/print/archive/etc.) the information conveyed by a required (but may be empty) element. The receiving application shall process the message if the element is omitted (that is, an exception shall not be raised because the element is missing).

C(a/b)	Conditional	The usage code has an associated condition predicate true (See section 2.B.7.9, "Condition predicate"). If the condition predicate associated with the element is true, follow the rules for ***a*** which shall be one of "R", "RE", "O" or X": If the condition predicate associated with the element is false, follow the rules for ***b*** which shall be one of "R", "RE", "O" or X". ***a*** and ***b*** can be the same.	
X	Not supported	The application (or configured) shall not implement "X" elements.	None, if the element is not sent. If the element is sent, the receiving application may process the message, shall ignore the element, and may raise an exception. The receiving application shall not process (save/print/archive/etc.) the information conveyed by a not-supported element.
O	Optional	None. The usage indicator for this element has not yet been defined. For an implementation profile all optional elements must be profiled to R, RE, C(a/b), or X.	None.

--------- *end citation* ---------

1.4.HL7 Version

This guide is written for version 2.5.1, however several items have been pre-adopted from versions 2.7.1 and 2.8.1. These pre-adopted items are noted throughout this guide.

Submission of version 2.5.1 messages is required.

1.5.MDHHS Point of Contact

Questions or comments should be directed to the MDHHS BOL by email: LIMS_HELP@michigan.gov or (517) 335-9604 - during normal business hours.

1.6.Labeling of Clinical Specimens

Please read instructions pertaining to individual test units for more specific instructions.

1. Use containers (mailing units) provided by the MDHHS Bureau of Laboratories for the collection and transport of specimens.
2. The specimen must be properly identified with two unique identifiers clearly written on the specimen container; both identifiers must match the HL7 order exactly. Examples of acceptable patient identifiers

include patient last & first name, date of birth, medical record number (MRN), and specimen accession number. The BOL reserves the right to not report testing results unless all required information is provided. Unlabeled or mislabeled specimens will not be tested.

3. If the patient (or a family member) is to collect the specimen, it may be necessary to write the patient's name on the container prior to dispensing the container. Please instruct the patient on the proper specimen collection method.
4. Please submit specimens in the appropriate transport containers. Do not submit cultures in petri plates as they are easily broken.
5. The use of barcodes is encouraged for key identifiers. The preferred barcode format is Code39 (a.k.a. Code 3 of 9).

1.7.Required Packing Slip

In addition to properly labeling the specimens, see Section 1.6, a packing list is also required. This packing list must include:

1. Date shipped
2. Ordering facility's:
    a. Name
    b. Address
    c. Telephone number, fax number and/or an email address where problems may be reported by the receiving laboratory
3. Count of specimens included in shipment
4. For each included specimens:
    a. Same two unique specimen identifiers that appear on the specimen. See Section 1.6.
    b. Patient information, unless anonymous testing is required:
        i. Full Name
        ii. Date of birth
        iii. Medical Record Number or equivalent
    c. Test(s) requested
    d. Type of specimen

This packing list maybe combined with items to address US DOT and IATA regulations related to shipping clinical specimens - (see Section 1.8). The use of barcodes is encouraged for key identifiers. The preferred barcode format is Code39 (a.k.a. Code 3 of 9). An example of a preferred specimen packing list may be found on the Laboratory Services Guide website at **http://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_5103_26138-362966--,00.html.**

1.8.Shipping Clinical Specimens

When shipping clinical specimens, US DOT and IATA regulations require an itemized list of contents be included in the package and placed between the secondary and outer containers. A packing list of specimens being submitted will suffice to meet these regulations. Example of a preferred specimen packing list: See IATA Packing Instructions 650 and Packing Instructions 620 and US DOT 49 CFR Part 173.196.

1.9.Revisions of this Document

This document will be reviewed and possibly revised on an annual basis. Submitters are advised to monitor the

web site for new versions. Revisions, along with major items changed, are tracked in APPENDIX H - Revision History.

1.10. Copyright Information

2. Messages

The following sections detail the structure of each message, including segment name, usage, cardinality and description, as well as the definition of each segment used in the message structure.

Note that the first column (Segment) is listing the cardinality and optionality according to the base standard; the second column (Name) provides the segment or group name from the base standard, while the remaining columns (Usage, Cardinality, Description) define the constraints for this implementation guide. It is therefore possible that the base standard defines a segment as "O" (optional) with a cardinality of up to 1, while this implementation guide defines the segment in the Usage column as "R" (required) thus a cardinality of [1..1].

The OML^O21^OML_O21 message is constrained for transmitting laboratory orders from the Sender to the Receiver as defined in each Use Case.

2.1.OML^O21^OML_O21: Laboratory Order Message – New and Append Order

This message structure supports the use as defined in sections Scenario 1 – Electronic Ordering of New or Scheduled Laboratory Test(s) and Scenario 2 – Electronic Ordering of Add-On Laboratory Test(s).

Table 2 - OML^O21^OML_O21 New and Append Order

Segment	Name	Usage	Cardinality	Description
MSH	Message Header	R	[1..1]	The message header (MSH) segment contains information describing how to parse and process the message. This includes identification of message delimiters, sender, receiver, message type, timestamp, etc.
[{SFT}]	Software Segment	O		
[{NTE}]	Notes and Comments for Header	X		Excluded for this Implementation Guide
[	*PATIENT Begin*	R	[1..1]	
PID	Patient Identification	R	[1..1]	The patient identification (PID) segment is used to provide basic demographics regarding the subject of the testing. The subject shall be a person.
[PD1]	Additional Demographics	O		
[{NTE}]	Notes and Comments for PID	O		
[{NK1}]	Next of Kin/Associated Parties	Varies	[0..5]	Sender usage: 'RE'; Receiver usage: 'O'
[	*VISIT Begin*	Varies	Varies	Financial Information Profile usage: 'R' Financial Information Profile cardinality: [1..1] All other Profile usage: 'O'
PV1	Patient Visit	X		
[PV2]	Patient Visit – Additional Information	O		
]	*VISIT End*			

Segment	Name	Usage	Cardinality	Description
[{	*INSURANCE Begin*	Varies	Varies	Financial Information Profile usage: C(R/O) Condition Predicate: if PV1-20 (Financial Class) is valued 'T' (third party). Financial Information Profile cardinality: [0..1] All other Profile usage: 'O'
IN1	Insurance	C(R/O)	[0..2]	Condition Predicate: if the test ordered is a billed test. See the Laboratory Services Guide available on the BOL website for the list of billed test.
[IN2]	Insurance – Additional Information	RE	[0..1]	Used to send the Medicaid Beneficiary ID
[IN3]	Insurance – Additional Information – Cert.	O		
}]	*INSURANCE End*			
GT1	Guarantor	Varies	Varies	Financial Information Profile usage: 'RE' Financial Information Profile cardinality: [0..1] All other Profile usage: 'O'
[{AL1}]	Allergy Information	O		
]	*PATIENT End*			
{	*ORDER Begin*	R	[1..*]	
ORC	Order Common	R	[1..1]	The common order (ORC) segment identifies basic information about the order for testing of the specimen. This segment includes identifiers of the order, who placed the order, when it was placed, what action to take regarding the order, etc.
[{	*TIMING_QTY Begin*	X		
TQ1	Timing/Quantity	X		
[{TQ2}]	Timing/Quantity Order Sequence	X		
}]	*TIMING_QTY End*			
	OBSERVATION_REQUEST Begin	R	[1..1]	
OBR	Observations Request	R	[1..*]	The observation request (OBR) segment is used to capture information about one test being performed on the specimen. Most importantly, the OBR identifies the type of testing to be performed on the specimen, and ties that information to the order for the testing. Note: See Section 3.1.7 "Multiple Orders" for additional information.
[TCD]	Test Code Details	X		Excluded for this Implementation Guide
[{NTE}]	Notes and Comments for Detail	RE	[0..*]	
[{PRT}]	Participation (for Obs Request)	C(R/O)	[0..5]	Condition Predicate: If OBR-28 (Result Copies To) is valued. Note: There should be one PRT for each repeat of OBR-28 (Result Copies To). Sender and receiver must also support PRT where PRT-4 is 'RCT'.
[CTD]	Contact Data	O		
[{DG1}]	Diagnosis	C(R/RE)	[0..*]	Condition Predicate: If PV1-20 (Financial Class) is valued 'T' (third party).

Segment	Name	Usage	Cardinality	Description
[{	*OBSERVATION Begin*	RE	[0..*]	
OBX	Observation/Result	R	[1..1]	
[TCD]	Test Code Details	O		
[{NTE}]	Notes and Comments for Details	O		
}]	*OBSERVATION End*			
[{	*SPECIMEN Begin*	R	[1..*]	
SPM	Specimen Information	R	[1..1]	The specimen information (SPM) segment describes the characteristics of a single sample. The SPM segment carries information regarding the type of specimen, where and how it was collected, who collected it, and some basic characteristics of the specimen.
[{OBX}]	Observation related to Specimen	O		
[{	*CONTAINER Begin*	X		Excluded for this Implementation Guide
SAC	Specimen Container	X		Excluded for this Implementation Guide
[{OBX}]	Observation related to Container	X		Excluded for this Implementation Guide
}]	*CONTAINER End*	X		Excluded for this Implementation Guide
}]	*SPECIMEN End*			
[{	*PRIOR_RESULT Begin*	RE	[0..*]	Prior Results are required for some lab test, see the BOL Laboratory Services Guide for details.
	SGH			
[	*Patient prior Begin*	O		
PID	Patient Identification	R	[1..1]	
[PD1]	Additional Demographics	O		
]	*Patient prior End*			
[	*Visit Begin*	O		
PV1	Patient Visit	R	[1..1]	
[PV2]	Patient Visit – Additional Information	O		
]	*Patient Visit End*			
[{AL1}]	Allergy Information	O		
{	*Order Prior Begin*			
[ORC]	Order Common	O		
OBR	Observations Request	R	[1..1]	
[{NTE}]	Notes and Comments for Details	O		
[{	*Timing Prior Begin*	RE		

Segment	Name	Usage	Cardinality	Description
TQ1	Timing/Quantity	R	[1..1]	
[{TQ2}]	Timing/Quantity Order Sequence	O		
}]	*Timing Prior End*			
{	*Observation Prior Begin*	R	[1..*]	
OBX	Observation/Result	R	[1..1]	
[{NTE}]	Notes and Comments for Details	O		
}	*Observation Prior End*			
}	*Order Prior End*			
	SGT			
}]	*PRIOR_RESULT End*			
}	*OBSERVATION_ REQUEST End*			
[{FTI}]	Financial Transaction	O		
{[CTI]}	Clinical Trial Identification	O		
[BLG]	Billing Segment	O		
}	*ORDER End*			

Usage Note

The specimen group is required if known at the time of the order placement, i.e., when the provider collects the specimen, and is used to carry specimen information that is no longer contained in the OBR segment. Each specimen group documents a single sample.

When placing an add-on order, the specimen information that the order is intended to be added onto should be included whenever possible, i.e., when the provider adds an order to the specimen that they collected.

2.2.OML^O21^OML_O21: Laboratory Order Message – Cancel Order

This message structure supports section Scenario 3 – Requesting the Cancellation of a Previously Placed Laboratory Order and Scenario 4 – Laboratory Cancellation of a Previously Placed Laboratory Order.

The control code in ORC indicates if the Ordering Provider or the Laboratory initiated the cancellation.

Table 3 - OML^O21^OML_O21 Cancel Order - Ordering Provider Initiated

Segment	Name	Usage	Cardinality	Description
MSH	Message Header	R	[1..1]	The message header (MSH) segment contains information describing how to parse and process the message. This includes identification of message delimiters, sender, receiver, message type, timestamp, etc.
[{SFT}]	Software Segment	O		

Segment	Name	Usage	Cardinality	Description
[{NTE}]	Notes and Comments for Header	O		
[	*PATIENT Begin*	R	[1..1]	
PID	Patient Identification	R	[1..1]	The patient identification (PID) segment is used to provide basic demographics regarding the subject of the testing. The subject shall be a person.
[PD1]	Additional Demographics	O		
[{NTE}]	Notes and Comments for PID	O		
[{NK1}]	Next of Kin/Associated Parties	X		Excluded for this Implementation Guide
	VISIT Begin	X		Excluded for this Implementation Guide
PV1	Patient Visit	X		Excluded for this Implementation Guide
[PV2]	Patient Visit – Additional Information	X		Excluded for this Implementation Guide
	VISIT End			
[{	*INSURANCE Begin*	X		Excluded for this Implementation Guide
IN1	Insurance	X		Excluded for this Implementation Guide
[IN2]	Insurance – Additional Information	X		Excluded for this Implementation Guide
[IN3]	Insurance – Additional Information – Cert.	X		Excluded for this Implementation Guide
}]	*INSURANCE End*			
GT1	*Guarantor*	X		Excluded for this Implementation Guide
[{AL1}]	Allergy Information	X		Excluded for this Implementation Guide
]	*PATIENT End*			
{	*ORDER Begin*	R	[1..*]	
ORC	Order Common	R	[1..1]	The common order (ORC) segment identifies basic information about the order for testing of the specimen. This segment includes identifiers of the order, who placed the order, when it was placed, what action to take regarding the order, etc.
[{	*TIMING_QTY Begin*	O		
TQ1	Timing/Quantity	R	[1..1]	
[{TQ2}]	Timing/Quantity Order Sequence	O		
}]	*TIMING_QTY End*			
	OBSERVATION_REQUEST Begin	R	[1..1]	
OBR	Observations Request	R	[1..*]	The observation request (OBR) segment is used to capture information about one test being performed on the specimen. Most importantly, the OBR identifies the type of testing to be performed on the specimen, and ties that information to the order for the testing.
[TCD]	Test Code Details	O		

Segment	Name	Usage	Cardinality	Description
[{NTE}]	Notes and Comments for Detail	RE	[0..*]	
[CTD]	Contact Data	X		Excluded for this Implementation Guide
[{DG1}]	Diagnosis	X		Excluded for this Implementation Guide
[{	*OBSERVATION Begin*	X		Excluded for this Implementation Guide
OBX	Observation/Result	X		Excluded for this Implementation Guide
[TCD]	Test Code Details	X		Excluded for this Implementation Guide
[{NTE}]	Notes and Comments for Details	X		Excluded for this Implementation Guide
}]	*OBSERVATION End*			
[{	*SPECIMEN Begin*	X		Excluded for this Implementation Guide
SPM	Specimen Information	X		Excluded for this Implementation Guide
[{OBX}]	Observation related to Specimen	X		Excluded for this Implementation Guide
[{	*CONTAINER Begin*	X		Excluded for this Implementation Guide
SAC	Specimen Container	X		Excluded for this Implementation Guide
[{OBX}]	Observation related to Container	X		Excluded for this Implementation Guide
}]	*CONTAINER End*			
}]	*SPECIMEN End*			
[{	*PRIOR_RESULT Begin*	X		Excluded for this Implementation Guide
…	Prior result segments excluded	X		Excluded for this Implementation Guide
}]	*PRIOR_RESULT End*			
}	*OBSERVATION_ REQUEST End*			
[{FTI}]	Financial Transaction	X		Excluded for this Implementation Guide
{[CTI]}	Clinical Trial Identification	O		
[BLG]	Billing Segment	X		Excluded for this Implementation Guide
}	*ORDER End*			

Usage Note

Timing/Quantity information is not necessary upon canceling an order as the current scope only includes individual instances of future orders.

2.3.ACK^O21^ACK: Laboratory Order Message – System Level Acknowledgement

Guaranteed delivery is required. All messages will receive an ACK.

Table 4 - ACK^O21^ACK Abstract Message Syntax

Segment	Name	Usage	Cardinality	Description
MSH	Message Header	R	[1..1]	The message header (MSH) segment contains information describing how to parse and process the message. This includes identification of message delimiters, sender, receiver, message type, timestamp, etc.
[{SFT}]	Software Segment	O		
MSA	Message Acknowledgment	R	[1..1]	The Message Acknowledgment Segment (MSA) contains the information sent as acknowledgment to the order message received by a LIS or EHR-S.
[{ERR }]	Error	C(R/O)	[0..*]	Condition predicate: If MSA-1 (Message Acknowledgement) is not valued 'AA' or 'CA'.

2.4.ORL^O22^ORL_O22: Laboratory Order Message – Application Level Acknowledgement

Table 5 - ORL^O22^ORL_O22 Abstract Message Syntax

Segment	Name	Usage	Cardinality	Description
MSH	Message Header	R	[1..1]	The message header (MSH) segment contains information describing how to parse and process the message. This includes identification of message delimiters, sender, receiver, message type, timestamp, etc.
MSA	Message Acknowledgment	R	[1..1]	The Message Acknowledgment Segment (MSA) contains the information sent as acknowledgment to the order message received by a LIS or EHR-S.
[{ ERR }]	Error	C(R/O)	[0..*]	Condition Predicate: If ORC-1 (Order Control) is valued 'UC' or 'UA'.
[{ SFT }]	Software	O		
[{ NTE }]	Notes and Comments (for Header)	O		
[	*RESPONSE Begin*	R	[1..1]	
[	*PATIENT Begin*	R	[1..1]	
PID	Patient Identification	R	[1..1]	
[{	*ORDER Begin*	R	[1..*]	
ORC	Common Order	R	[1..1]	
[{	*TIMING Begin*	O		
TQ1	Timing/Quantity	O		
[{ TQ2 }]	Timing/Quantity Order Sequence	O		
}]	*TIMING End*			
[	*OBSERVATION_REQUEST begin*	R	[1..1]	

Segment	Name	Usage	Cardinality	Description
OBR	Observation Request	R	[1..*]	
[{	*SPECIMEN Begin*	O		
SPM	Specimen	O		
[{ SAC }]	Specimen Container Details	O		
}]	*SPECIMEN End*			
]	*OBSERVATION_REQUEST End*			
}]	*ORDER End*			
]	*PATIENT End*			
]	*RESPONSE End*			

2.5.Segment and Field Descriptions

This messaging guide provides notes for required (non-optional) fields for each of the non-optional segments. For each segment the segment table defines the applicable constraints on usage for its fields for this implementation guide, see Section Message Element Attributes for a description of the columns in the Segment Attribute Tables. All the relevant conformance statements and general usage notes are located at the end of each table.

Note that any optional segments that are brought forward from the base will have to be used within the constraints set forth in this guide, e.g., constraint statements will be required to use the GU or NG profiles, and agreement about which CWE data type to use needs to be reached.

2.5.1. MSH – Message Header Segment

Table 6 - MSH – Message Header Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Field Separator	ST	R	[1..1]		
2	Encoding Characters	ST	R	[1..1]		Constrained to the literal values '^~\&' or '^~\&#', always appearing in the same order.
3	Sending Application	HD	R	[0..1]	HL70361	Required for Michigan HIE platform-related routing requirements.
4	Sending Facility	HD	R	[1..1]	HL70362	Required for Michigan HIE platform-related routing requirements. If acknowledgments are in use, this facility will receive any related acknowledgment message.
5	Receiving Application	HD	R	[0..1]	HL70361	SHALL be the literal values in Table 7 - MSH-5 (Receiving Application) Values Required for Michigan HIE platform-related routing requirements.

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
6	Receiving Facility	HD	R	[0..1]	HL70362	SHALL be the literal value of "MDHHS^2.16.840.1.114222.4.3.2.2.3.161.1^ISO" Required for Michigan HIE platform-related routing requirements. If acknowledgments are in use, this facility originates any related acknowledgment message.
7	Date/Time Of Message	TS_1	R	[1..1]		If the time zone offset is included in MSH-7 (Date/Time Of Message) it becomes the default time zone for the message instance and applies to all other date/time fields in that same message instance where a time zone offset is not valued, except as otherwise indicated through the use of the LAB_TO_Component profile.
8	Security		O			
9	Message Type	MSG	R	[1..1]		
10	Message Control ID	ST	R	[1..1]		String that identifies the message instance from the sending application. Example formats for message control IDs include GUID, timestamp plus sequence number, OID plus sequence number, or sequence number. The important point is that care must be taken to ensure that the message control id is unique within the system originating the message.
11	Processing ID	PT	R	[1..1]		
12	Version ID	VID	R	[1..1]		HL7 version number used to interpret format and content of the message. Constrained to the literal value '2.5.1'.
13	Sequence Number		O			
14	Continuation Pointer		O			
15	Accept Acknowledgment Type	ID	R	[1..1]	HL70155	SHALL be the literal value of "AL" Due to the public health nature of these messages, MDHHS will acknowledge all messages. Note: not supported in ACK messages.
16	Application Acknowledgment Type	ID	R	[1..1]	HL70155	SHALL be the literal value of "AL" Due to the public health nature of these messages, MDHHS will acknowledge all messages. Note: not supported in ACK messages.
17	Country Code		O			
18	Character Set		O			
19	Principal Language Of Message		O			
20	Alternate Character Set Handling Scheme		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
21	Message Profile Identifier	EI_GU	R	[1..*]		The sender asserts that the message conforms to a given profile and/or valid combination of components. Note: not supported in ACK and OLM messages.

Usage Note

MSH-5 (Receiving Application)

The MSH -5 field must be populated with one of the following items depending on the lab location the specimen is being sent to**.**

Table 7 - MSH-5 (Receiving Application) Values

MSH-5 Value	Location	Note
LAN^23D0650909^CLIA	Lansing	State Public Health Lab

MSH-21 (Message Profile Identifier)

The MSH-21 field shall identify exclusively one lab order interface profile (i.e., MSH-21 shall not be populated with conflicting LOI profiles/components or other third-party profiles).

Table 8 - MSH 21 Orders Profiles

LOI Profile	Pre-Coordinated OID	Component OIDs	Component Name
LOI_NG_PRN_Profile	2.16.840.1.113883.9.88	~~2.16.840.1.113883.9.66~~ ~~2.16.840.1.113883.9.79~~ ~~2.16.840.1.113883.9.82~~	LOI_Common_Component LOI_NG_Component LAB_PRU_Component
		2.16.840.1.113883.9.80	LAB_FI_Component
		2.16.840.1.113883.9.94	LOI_PH_Component
		2.16.840.1.113883.9.22	LAB_TO_Component
		2.16.840.1.113883.9.95	LOI_PR_Component

Examples

```
MSH…|||||LOI_NG_PRN_Profile^^2.16.840.1.113883.9.88^ISO~LAB_FI_Component^^2.16.840.1.1138
83.9.80^ISO~LOI_PH_Component^^2.16.840.1.113883.9.94^ISO~LAB_TO_Component^^2.16.840.1.113
883.9.22^ISO~LOI_PR_Component^^2.16.840.1.113883.9.95^ISO
```

Conformance Statements: LOI_Common_Component

LOI-8: MSH-1 (Field Separator) **SHALL** contain the constant value '|'.

LOI-9: MSH-2 (Encoding Characters) **SHALL** contain the constant value '^~\&' or the constant value '^~\&#'.

LOI-10: MSH-9 (Message Type) **SHALL** contain the constant value 'OML^O21^OML_O21'.

LOI-11: MSH-12.1 (Version ID) **SHALL** contain the constant value '2.5.1'.

LOI-12: The sender and receiver **SHALL** support 'AL' for MSH-15 (Accept Acknowledgement Type) upon sending the order (ORC-1 is valued 'NW'), cancellation request (ORC-1 is valued 'CA'), or cancellation notification (ORC-1 is valued 'OC')

LOI-13: The sender and receiver **SHALL** support 'AL' for MSH-16 (Application Acknowledgement Type) upon sending the order (ORC-1 is valued 'NW'), cancellation request (ORC-1 is valued 'CA'), or cancellation notification (ORC-1 is valued 'OC').

The table below indicates valid MSH-21 combinations for declaring conformance to a particular LOI acknowledgement profile.

Table 9 - MSH 21 Acknowledgment Profile Combinations

LOI Profile	Pre-Coordinated OID	Component OIDs	Component Name
LOI_GU_Response_Profile	2.16.840.1.113883.9.92	2.16.840.1.113883.9.89 2.16.840.1.113883.9.90	LOI_Acknowledgement_Component LOI_GU_Acknowledgement_Component
LOI_NG_Response_Profile	2.16.840.1.113883.9.93	2.16.840.1.113883.9.89 2.16.840.1.113883.9.91	LOI_Acknowledgement_Component LOI_NG_Acknowledgement_Component

Conformance Statements: LOI_Acknowledgement_Component

LOI-18: MSH-1 (Field Separator) **SHALL** contain the constant value '|'.

LOI-19: MSH-2 (Encoding Characters) **SHALL** contain the constant value '^~\&' or the constant value '^~\&#'.

LOI-20: MSH-9 (Message Type) **SHALL** contain the value 'ACK^O21^ACK' or 'ORL^22^ORL^O22'.

LOI-21: MSH-12.1 (Version ID) **SHALL** contain the constant value '2.5.1'.

LOI-22: If MSH-9 (Message Type) is 'ACK^O21^ACK', MSH-15 (Accept Acknowledgement Type) **SHALL** contain the constant value 'NE'.

LOI-23: If MSH-9 (Message Type) is 'ACK^O21^ACK', MSH-16 (Application Acknowledgement Type) **SHALL** contain the constant value 'NE'.

LOI-24: If MSH-9 (Message Type) is 'ORL^22^ORL^22', MSH-15 (Accept Acknowledgement Type) **SHALL** contain the constant value 'AL'.

LOI-25: If MSH-9 (Message Type) is 'ORL^22^ORL^22', MSH-16 (Application Acknowledgement Type) **SHALL** contain the constant value 'NE'.

2.5.2. MSA – Acknowledgement Segment

Table 10 - MSA – Acknowledgement Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Acknowledgment Code	ID	R	[1..1]	HL70008	
2	Message Control ID	ST	R	[1..1]		
3	Text Message		X			Excluded for this Implementation Guide
4	Expected Sequence Number		O			
5	Delayed Acknowledgment Type		X			Excluded for this Implementation Guide
6	Error Condition		X			Excluded for this Implementation Guide

2.5.3. ERR – Error Segment

Table 11 - ERR – Error Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Error Code and Location		X			Excluded for this Implementation Guide
2	Error Location		O			
3	HL7 Error Code	CWE	R	[1..1]	HL70357	
4	Severity	ID	R	[1..1]	HL70516	
5	Application Error Code		O			
6	Application Error Parameter		O			
7	Diagnostic Information	TX	RE	[0..1]		
8	User Message		O			
9	Inform Person Indicator		O			
10	Override Type		O			
11	Override Reason Code		O			
12	Help Desk Contact Point		O			

2.5.4. PID – Patient Identification Segment

Table 12 - Patient Identification Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID – PID	SI	R	[1..1]		Constrained to the literal value '1'.
2	Patient ID		X			Excluded for this Implementation Guide
3	Patient Identifier List	CX	RE	[0..1]		
4	Alternate Patient ID – PID		X			Excluded for this Implementation Guide
5	Patient Name	XPN	R	[1..1]		For anonymous testing for HIV related test, use first name = `testing` and last name = `anonymous`. See Section 0 for more details.

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
6	Mother's Maiden Name	XPN	RE	[0..1]		
7	Date/Time of Birth	TS_5	R	[1..1]		Shall include year, month, and day. May include hours, minutes, and seconds.
8	Administrative Sex	IS	R	[1..1]	HL70001	Patient's gender.
9	Patient Alias		X			Excluded for this Implementation Guide
10	Race	CWE_CR1	RE	[0..*]	HL70005	Note that state and/or national regulations may dictate other behaviors. The PID-10 (Race) value is provided for demographic/billing purposes, not clinical use.
11	Patient Address	XAD	RE	[0..*]		
12	County Code		X			Excluded for this Implementation Guide
13	Phone Number – Home	XTN	RE	[0..*]		
14	Phone Number – Business	XTN	RE	[0..*]		
15	Primary Language		O			
16	Marital Status		O			
17	Religion		O			
18	Patient Account Number		C(R/O)			Used for testing related to AIDS Drug Assistance Program (ADAP), known as Michigan HIV/AIDS Drug Assistance Program (MIDAP) within Michigan. See Section Anonymous Testing3.1.8 for more details.
19	SSN Number – Patient		X			Excluded for this Implementation Guide
20	Driver's License Number – Patient		X			Excluded for this Implementation Guide
21	Mother's Identifier		O			
22	Ethnic Group	CWE_CR1	RE	[0..1]	HL70189	
23	Birth Place		O			
24	Multiple Birth Indicator		O			
25	Birth Order		O			
26	Citizenship		O			
27	Veterans Military Status		O			
28	Nationality		X			Excluded for this Implementation Guide
29	Patient Death Date and Time	TS_3	C(RE/O)	[0..1]		Condition Predicate: If PID-30 (Patient Death Indicator) is valued 'Y'.
30	Patient Death Indicator	ID	RE	[0..1]	HL70136	
31	Identity Unknown Indicator		X			Excluded for this Implementation Guide
32	Identity Reliability Code		O			
33	Last Update Date/Time		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
34	Last Update Facility		O			
35	Species Code		X			The BOL does not support animal orders and results via HL7
36	Breed Code		X			The BOL does not support animal orders and results via HL7
37	Strain		X			Excluded for this Implementation Guide
38	Production Class Code		X			Excluded for this Implementation Guide
39	Tribal Citizenship		X			Excluded for this Implementation Guide,

Usage Note

PID-10 (Race), PID-22 (Ethnic Group)

The use of CWE is pre-adopted from HL7 V.2.7.1.

Conformance Statements: LOI_Common_Component

LOI-28: PID-1 (Set ID - PID) **SHALL** be valued with the constant value '1'.

LOI-29: If PV1-20 (Patient Financial Class) is 'T' (Third Party) or 'P' (Patient), then PID-11 (Patient Address) **SHALL** include an address with type 'H'.

LOI-30: If PV1-20 (Patient Financial Class) is valued 'T' or 'P', PID-5.7 (Name Type Code) **SHALL** be valued 'L'.

2.5.5. NK1 – Next Of Kin / Associated Parties Segment

Preferred for some test

Table 13 - NK1 – Next Of Kin / Associated Parties Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID - NK1	SI	R	[1..1]		
2	Name	XPN_1	C(R/X)	[0..1]		Condition Predicate: If NK1-13 (Organization Name – NK1) is not valued.
3	Relationship	CWE_CR1	R	[1..1]	HL70063	Use of HL7 Table 0063 is unconstrained in this IG
4	Address	XAD	RE	[0..2]		
5	Phone Number	XTN	RE	[0..4]		
6	Business Phone Number		O			
7	Contact Role	CWE_CR1	RE	[0..1]	HL70131	
8	Start Date		O			
9	End Date		O			
10	Next of Kin / Associated Parties Job Title		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
11	Next of Kin / Associated Parties Job Code/Class	JCC	C(R/RE)	[0..1]		Condition Predicate: If NK1-7 (Contact Role) is 'E' (employer).
12	Next of Kin / Associated Parties Employee Number		O			
13	Organization Name - NK1	XON	C(R/X)	[0..1]		Condition Predicate: If NK1-2 (Name) is not valued.
14	Marital Status		O			
15	Administrative Sex		O			
16	Date/Time of Birth		O			
17	Living Dependency		O			
18	Ambulatory Status		O			
19	Citizenship		O			
20	Primary Language		O			
21	Living Arrangement		O			
22	Publicity Code		O			
23	Protection Indicator		O			
24	Student Indicator		O			
25	Religion		O			
26	Mother's Maiden Name		O			
27	Nationality		O			
28	Ethnic Group		O			
29	Contact Reason					
30	Contact Person's Name	XPN_1	C(RE/X)	[0..1]		PH Component Usage: 'C(RE/X)' Condition Predicate: If NK1-13 (Organization Name - NK1) is valued. All other profiles Usage: 'O'
31	Contact Person's Telephone Number		O			
32	Contact Person's Address	XAD	C(RE/X)	[0..1]		PH Component Usage: 'C(RE/X)' Condition Predicate: If NK1-13 (Organization Name - NK1) is valued. All other profiles Usage: 'O'
33	Next of Kin/Associated Party's Identifiers		O			
34	Job Status		O			
35	Race		O			
36	Handicap		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
37	Contact Person Social Security Number		X			Excluded from the Implementation Guide
38	Next of Kin Birth Place		O			
39	VIP Indicator		O			

Usage Note

NK1-3 (Relationship), NK1-7 (Contact Role)

The use of CWE is pre-adopted from HL7 v2.7.1.

2.5.6. IN1 – Insurance Segment

Failing to provide both Patient and Insurance information may result in the ordering facility getting billed for testing.

Table 14 – IN1 – Insurance Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID - IN1	SI	RE	[0..1]		
2	Insurance Plan ID	CWE_CR1	RE	[0..1]	HL70072 HL70353	If no user components of HL70072 or locally defined table, use the default value of 'NA' (not applicable) from Table HL70353 CWE Status Codes or draw another appropriate value from Table HL70353.
3	Insurance Company ID	CX	RE	[0..1]		
4	Insurance Company Name	XON_IN1	RE	[0..1]		
5	Insurance Company Address	XAD	RE	[0..1]		
6	Insurance Co Contact Person		O			
7	Insurance Co Phone Number		O			
8	Group Number	ST	RE	[0..1]		
9	Group Name		O			
10	Insured's Group Emp ID		O			
11	Insured's Group Emp Name	XON	C(R/O)	[0..1]		Condition Predicate: If IN1-31 (Type of Agreement Code) is valued 'W' (Workman's Comp).
12	Plan Effective Date		O			
13	Plan Expiration Date	DT	RE	[0..1]		
14	Authorization Information		O			
15	Plan Type		O			
16	Name Of Insured	XPN_1	RE	[0..1]		
17	Insured's Relationship To Patient	CWE_CR1	RE	[0..1]	HL70063	
18	Insured's Date Of Birth	TS_2	RE	[0..1]		

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
19	Insured's Address	XAD	RE	[0..1]		
20	Assignment Of Benefits		O			
21	Coordination Of Benefits		O			
22	Coord Of Ben. Priority		O			
23	Notice Of Admission Flag		O			
24	Notice Of Admission Date		O			
25	Report Of Eligibility Flag		O			
26	Report Of Eligibility Date		O			
27	Release Information Code		C(R/O)	[0..1]		Condition Predicate: Shall be populated when confidential testing is required. Set to 'N' in cases where confidential testing is required, and insurance should not be billed for testing. Note, submitter is responsible for any fees related to confidential test. In all other cases it may be set to 'Y' or left blank. See Section 3.1.6 "Confidential Testing" for additional information.
28	Pre-Admit Cert (PAC)		O			
29	Verification Date/Time		O			
30	Verification By		O			
31	Type Of Agreement Code	IS	RE	[0..1]	HL70098	
32	Billing Status		O			
33	Lifetime Reserve Days		O			
34	Delay Before L.R. Day		O			
35	Company Plan Code		O			
36	Policy Number	ST	RE	[0..1]		
37	Policy Deductible		O			
38	Policy Limit - Amount		O			
39	Policy Limit - Days		O			
40	Room Rate - Semi-Private		X			Excluded for this Implementation Guide
41	Room Rate - Private		X			Excluded for this Implementation Guide
42	Insured's Employment Status		O			
43	Insured's Administrative Sex		O			
44	Insured's Employer's Address		O			
45	Verification Status		O			
46	Prior Insurance Plan ID		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
47	Coverage Type		O			
48	Handicap		O			
49	Insured's ID Number		O			
50	Signature Code		O			
51	Signature Code Date		O			
52	Insured's Birth Place		O			
53	VIP Indicator		O			

Usage Note

IN1-2 (Insurance Plan ID), IN1-17 (Insured's Relationship To Patient)

The use of CWE is pre-adopted from HL7 V.2.7.1.

2.5.7. IN2 – Insurance Segment

Failing to provide both Patient and Insurance information my result and the ordering facility getting billed for testing.

Table 15 – IN2 – Insurance Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Insured's Employee ID	CX	O			
2	Insured's Social Security Number	ST	X			Excluded for this Implementation Guide
3	Insured's Employer's Name and ID	XCN	O			
4	Employer Information Data	IS	O			
5	Mail Claim Party	IS	O			
6	Medicare Health Ins Card Number	ST	O			
7	Medicaid Case Name	XPN	O			
8	Medicaid Case Number	ST	RE	[0..1]		Used for the Medicaid beneficiary ID that is assigned by Medicaid, note this is different from a Medicaid Managed Care Organization (MCO) ID that is assigned by the MCO. MCO information shall be sent in the corresponding fields with IN1.
9	Military Sponsor Name	XPN	O			
10	Military ID Number	ST	O			
11	Dependent Of Military Recipient	CE	O			
12	Military Organization	ST	O			
13	Military Station	ST	O			
14	Military Service	IS	O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
15	Military Rank/Grade	IS	O			
16	Military Status	IS	O			
17	Military Retire Date	DT	O			
18	Military Non-Avail Cert On File	ID	O			
19	Baby Coverage	ID	O			
20	Combine Baby Bill	ID	O			
21	Blood Deductible	ST	O			
22	Special Coverage Approval Name	XPN	O			
23	Special Coverage Approval Title	ST	O			
24	Non-Covered Insurance Code	IS	O			
25	Payor ID	CX	O			
26	Payor Subscriber ID	CX	O			
27	Eligibility Source	IS	O			
28	Room Coverage Type/Amount	RMC	O			
29	Policy Type/Amount	PTA	O			
30	Daily Deductible	DDI	O			
31	Living Dependency	IS	O			
32	Ambulatory Status	IS	O			
33	Citizenship	CE	O			
34	Primary Language	CE	O			
35	Living Arrangement	IS	O			
36	Publicity Code	CE	O			
37	Protection Indicator	ID	O			
38	Student Indicator	IS	O			
39	Religion	CE	O			
40	Mother's Maiden Name	XPN	O			
41	Nationality	CE	O			
42	Ethnic Group	CE	O			
43	Marital Status	CE	O			
44	Insured's Employment Start Date	DT	O			
45	Employment Stop Date	DT	O			
46	Job Title	ST	O			
47	Job Code/Class	JCC	O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
48	Job Status	IS	O			
49	Employer Contact Person Name	XPN	O			
50	Employer Contact Person Phone Number	XTN	O			
51	Employer Contact Reason	IS	O			
52	Insured's Contact Person's Name	XPN	O			
53	Insured's Contact Person Phone Number	XTN	O			
54	Insured's Contact Person Reason	IS	O			
55	Relationship to the Patient Start Date	DT	O			
56	Relationship to the Patient Stop Date	DT	O			
57	Insurance Co. Contact Reason	IS	O			
58	Insurance Co Contact Phone Number	XTN	O			
59	Policy Scope	IS	O			
60	Policy Source	IS	O			
61	Patient Member Number	CX	O			
62	Guarantor's Relationship to Insured	CE	O			
63	Insured's Phone Number - Home	XTN	O			
64	Insured's Employer Phone Number	XTN	O			
65	Military Handicapped Program	CE	O			
66	Suspend Flag	ID	O			
67	Copay Limit Flag	ID	O			
68	Stoploss Limit Flag	ID	O			
69	Insured Organization Name and ID	XON	O			
70	Insured Employer Organization Name and ID	XON	O			
71	Race	CE	O			
72	CMS Patient's Relationship to Insured	CE	O			

2.5.8. GT1 – Guarantor Segment

Table 16– GT1– Guarantor Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID - GT1	SI	R	[1..1]		
2	Guarantor Number		O			
3	Guarantor Name	XPN_1	R	[1..1]		Beginning with Version 2.3, if the guarantor is an organization, send a null value ("") in GT1-3 (Guarantor Name) and put the organization name in GT1-21 (Guarantor Organization Name). Either Guarantor Name or Guarantor Organization Name is required.
4	Guarantor Spouse Name		O			
5	Guarantor Address	XAD	R	[1..1]		
6	Guarantor Ph Num – Home		O			
7	Guarantor Ph Num – Business		O			
8	Guarantor Date/Time Of Birth		RE			
9	Guarantor Administrative Sex		O			
10	Guarantor Type		O			
11	Guarantor Relationship	CWE_CR1	R	[1..1]	HL70063	
12	Guarantor SSN		O			
13	Guarantor Date - Begin		O			
14	Guarantor Date - End		O			
15	Guarantor Priority		O			
16	Guarantor Employer Name		O			
17	Guarantor Employer Address		O			
18	Guarantor Employer Phone Number		O			
19	Guarantor Employee ID Number		O			
20	Guarantor Employment Status		O			
21	Guarantor Organization Name	XON	R	[1..1]		Beginning with Version 2.3, if the guarantor is a person, send a null value ("") in GT1-21 (Guarantor Organization Name) and put the person name in GT1-3 (Guarantor Name). Either guarantor person name or guarantor organization name is required.
22	Guarantor Billing Hold Flag		O			
23	Guarantor Credit Rating Code		O			
24	Guarantor Death Date And Time		O			
25	Guarantor Death Flag		O			
26	Guarantor Charge Adjustment Code		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
27	Guarantor Household Annual Income		O			
28	Guarantor Household Size		O			
29	Guarantor Employer ID Number		O			
30	Guarantor Marital Status Code		O			
31	Guarantor Hire Effective Date		O			
32	Employment Stop Date		O			
33	Living Dependency		O			
34	Ambulatory Status		O			
35	Citizenship		O			
36	Primary Language		O			
37	Living Arrangement		O			
38	Publicity Code		O			
39	Protection Indicator		O			
40	Student Indicator		O			
41	Religion		O			
42	Mother's Maiden Name		O			
43	Nationality		O			
44	Ethnic Group		O			
45	Contact Person's Name		O			
46	Contact Person's Telephone Number		O			
47	Contact Reason		O			
48	Contact Relationship		O			
49	Job Title		O			
50	Job Code/Class		O			
51	Guarantor Employer's Organization Name		O			
52	Handicap		O			
53	Job Status		O			
54	Guarantor Financial Class		O			
55	Guarantor Race		O			
56	Guarantor Birth Place		O			
57	VIP Indicator		O			

Usage Note

GT1-11 (Guarantor Relationship)

The use of CWE is pre-adopted from HL7 V.2.7.1.

Conformance Statements: LOI_Common_Component

LOI-32: GT1-1 (Set ID – GT1) **SHALL** be valued with the constant value '1'.

LOI-33: If GT1-3 (Guarantor Name) is ' "" ' then GT1-21 (Guarantor Organizational Name) **SHALL** be valued.

LOI-34: If GT1-21 (Guarantor Organization Name) is valued ' "" ' then GT1-3 (Guarantor Name) **SHALL** be valued.

Note: The ' "" ' means that the literal string of two double-quotes are conveyed in the message, the field is not empty.

2.5.9. ORC – Common Order Segment

Table 17 - ORC – Common Order Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Order Control	ID	R	[1..1]	HL70119 (constrained)	
2	Placer Order Number	EI	R	[1..1]		GU Data Type: EI_GU
3	Filler Order Number	EI	RE	[0..1]		Filler order number is usually not known for a new order, but may be known for cancel orders.
4	Placer Group Number	EI	RE	[0..1]		
5	Order Status		O			
6	Response Flag		O			
7	Quantity/Timing		X			Excluded for this Implementation Guide
8	Parent		O			
9	Date/Time of Transaction	TS_4	R	[1..1]		
10	Entered By		O			
11	Verified By		O			
12	Ordering Provider	XCN	R	[1..1]	NPI	Must include a valid NPI, the assigning authority of "NPI", as well as the provider's family/last name.
13	Enterer's Location		O			
14	Call Back Phone Number	XTN	RE	[0..2]		
15	Order Effective Date/Time	TS_5	C(R/O)	[0..1]		Condition Predicate: If ORC-1 is 'OP'.
16	Order Control Code Reason	CWE	C(R/O)	[0..1]		Condition Predicate: If ORC-1 is 'OP'.
17	Entering Organization		O			
18	Entering Device		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
19	Action By		O			
20	Advanced Beneficiary Notice Code	CWE_CR1	RE	[1..1]	HL70339	
21	Ordering Facility Name	XON	R	[1..1]	StarLIMS Agency ID	Ordering facilities SHALL include their StarLIMS Agency ID in ORC-21.10 and the literal value of "`StarLIMS_Agency`" in ORC-21.6
22	Ordering Facility Address	XAD	R	[1..1]		
23	Ordering Facility Phone Number	XTN	R	[1..*]		
24	Ordering Provider Address		O			
25	Order Status Modifier		O			
26	Advanced Beneficiary Notice Override Reason	CWE_CRE1	C(R/O)	[0..1]	HL70552	Condition Predicate: If ORC-20 (ABN) is valued '4'.
27	Filler's Expected Availability Date/Time		O			
28	Confidentiality Code		O			
29	Order Type		O			
30	Enterer Authorization Mode	CNE	C(R/O)	[0..1]		Condition Predicate: If ORC-1 is 'OP'.
31	Parent Universal Service Identifier		O			

Usage Note

ORC-1 (Order Control)

This field shall be valued to 'OP' when the order represents a confirmation of an oral request for a test. 'OP' shall be used when the confirmation involves a new order. Note the condition predicates associated with ORC-15 (Order Effective Date/Time), ORC-16 (Order Control Code Reason), and ORC-30 (Enterer Authorization Mode). ORC-15 (Order Effective Date/Time) should reflect the date/time that the oral request was made, not when the electronic order was provided.

ORC-4 (Placer Group Number)

This field allows a Laboratory Order Sender to group sets of orders together and subsequently identify them. In some environments this might be considered a single document sometimes referred to as a test requisition or test request form. In other instances it may group orders placed for the same instance of care or diagnosis. All the orders with the same Placer Group Number are considered siblings of each other. Regardless of how the *identifier* that groups the siblings of a care instance is labeled, ORC-4 (Placer Group Number) is where one would convey that identifier.

ORC-16 (Order Control Code Reason)

The use of CWE is pre-adopted from HL7 V.2.7.1.

ORC-20 (Advanced Beneficiary Notice Code)

The use of CWE is pre-adopted from HL7 V.2.7.1. This field provides information from the ordering provider regarding those tests that are not covered under the patient's plan, and that the patient understands the test is not covered, that the patient will be billed, and that the patient has accepted the responsibility for the cost of those tests.

Conformance Statements: LOI_Common_Component

LOI-35: If ORC.1 (Order Control) is valued 'OP' then ORC-16 (Order Control Code Reason**) SHALL** contain the value "^oral request confirmation" and ORC.30 (Enterer Authorization Mode) **SHALL** contain 'VO^Voice^HL70483'.

LOI-36: The value of ORC-2 (Placer Order Number) **SHALL** be identical to the value of OBR-2 (Placer Order Number) within the same Order Group.

LOI-37: If valued, ORC-3 (Filler Order Number) **SHALL** be identical to the value of OBR-3 (Filler Order Number) within the same Order Group.

LOI-38: The value of ORC-12 (Ordering Provider) **SHALL** be identical to the value of OBR-16 (Ordering Provider) within the same Order Group.

Conformance Statements: LAB_PRN_Component

LOI-39: The value of ORC-31 (Parent Universal Service Identifier) **SHALL** be identical to the value of OBR-50 (Parent Universal Service Identifier).

Conformance Statements: LAB_FRU_Component

LOI-41: If valued, ORC-3 (Filler Order Number) **SHALL NOT** be valued identical to another instance of ORC-3 (Filler Order Number) within the same Order Group.

2.5.10. OBR – Observation Request Segment

Table 18 - OBR – Observation Request Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID - OBR	SI	R	[1..1]		For the first occurrence of the OBR segment, the Sequence number shall be one (1), for the second occurrence, the Sequence number shall be two (2), etc.
2	Placer Order Number	EI	R	[1..1]		GU Data Type: EI_GU
3	Filler Order Number	EI	RE	[0..1]		Filler order number is usually not known for a new order, but may be known for cancel orders.
4	Universal Service Identifier	CWE_CR	R	[1..1]	L	Local Codes shall be used as the standard vocabulary to identify the ordered test in OBR-4 (Universal Service Identifier). The below link has the **list of Local Codes**: MDHHS: List of Local Codes for OBR-4
5	Priority – OBR		X			Excluded for this Implementation Guide
6	Requested Date/Time		X			Excluded for this Implementation Guide

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
7	Observation Date/Time	TS_5	R	[1..1]		This reflects the specimen collection date/time when the test involves a specimen. Since a test may also involve drawing specimens at different times, i.e., tolerance tests, this date/time only covers the draw of the first specimen. All other specimen collection date/times, including the first one, are communicated in the SPM segment.
8	Observation End Date/Time	TS_5	RE	[0..1]		
9	Collection Volume		O			
10	Collector Identifier		O			
11	Specimen Action Code		O			Those who wish to communicate an intent to add the order to an existing specimen should value this field as 'A'.
12	Danger Code		O			
13	Relevant Clinical Information	CWE	RE		HL70916	This field pre-adopts the V2.7.1 definition.
14	Specimen Received Date/Time		X			Excluded for this Implementation Guide.
15	Specimen Source		X			Excluded for this Implementation Guide
16	Ordering Provider	XCN	R	[1..1]	NPI	Must include a valid NPI, the assigning authority of "`NPI`", as well as the provider's family/last name.
17	Order Call-back Phone Number	XTN	RE	[0..2]		
18	Placer Field 1		O			
19	Placer Field 2		O			
20	Filler Field 1		O			
21	Filler Field 2		O			
22	Results Rpt/Status Chng - Date/Time		X			Excluded for this Implementation Guide.
23	Charge to Practice		O			
24	Diagnostic Service Sect ID		O			
25	Result Status		X			Excluded for this Implementation Guide.
26	Parent Result		O			
27	Quantity/Timing		X			Excluded for this Implementation Guide.

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
28	Result Copies To	XCN	RE	[0..5]		Must include a valid StarLIMS Agency ID[3], the correct assigning authority for the identifier (StarLIMS), as well as the provider's family/last name. NOTE, a PRT segment is required for each Result Copies To. See Section 2.5.12 PRT – Participation Information Segment for more details.
29	Parent		O			
30	Transportation Mode		O			
31	Reason for Study	CWE	RE		Table 47 - BOL Table 0001 - Reason for Study	Used to identify the primary reason for the test, options include Diagnosis, Surveillance, Outbreak, etc. see Table 47 - BOL Table 0001 - Reason for Study for the full list. Note, this is a locally defined value set.
32	Principal Result Interpreter		O			
33	Assistant Result Interpreter		O			
34	Technician		O			
35	Transcriptionist		O			
36	Scheduled Date/Time		O			
37	Number of Sample Containers		O			
38	Transport Logistics of Collected Sample		O			
39	Collector's Comment		O			
40	Transport Arrangement Responsibility		O			
41	Transport Arranged		O			
42	Escort Required		O			
43	Planned Patient Transport Comment		O			
44	Procedure Code		O			
45	Procedure Code Modifier		O			
46	Placer Supplemental Service Information		O			
47	Filler Supplemental Service Information		O			
48	Medically Necessary Duplicate Procedure Reason		O			
49	Result Handling		X		HL70507 (V2.7.1)	Field is ignored and results are sent to all orders

[3] Contact the DASH unit at 517-335-8059 to find StarLIMS Agency IDs.

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
50	Parent Universal Service Identifier		O			

Usage Note

OBR-7 (Observation Date/Time), OBR-8 (Observation End Date/Time), SPM-17.1 (Range Start Date/Time), SPM-17.2 (Range End Date/Time)

If any of OBR-7 (Observation Date/Time), OBR-8 (Observation End Date/Time), SPM-17.1 (Range Start Date/Time), or SPM-17.2 (Range End Date/Time) contain time zone offset, then all must contain a time zone offset.

OBR-4 (Universal Service Identifier), OBR-13 (Relevant Clinical Information)

The use of CWE is pre-adopted from HL7 V.2.7.1.

Conformance Statements: LOI_Common_Component

LOI-43: If present, OBR-8 (Observation End Date/Time) **SHALL** be equal to or later than OBR-7 (Observation Date/Time).

LOI-44: The value of OBR-1 (Set ID – OBR) **SHALL** start at '1' and be incremented sequentially across the Order groups.

Note: For the first occurrence of the OBR segment, the Sequence number shall be one (1), for the second occurrence, the Sequence number shall be two (2), etc. For each order group, the prior results OBR-1 is set to 1 with the first occurrence, and then increments sequentially as shown in the example below:

```
MSH|...<cr>
PID|...<cr>
// First order group
ORC|NW|...<cr>
OBR|1|...<cr>
SPM|1|...<cr>
SPM|2|...<cr>
// end first order group
// Second order group
ORC|NW|...<cr>
OBR|2|...<cr>
SPM|1|...<cr>
SPM|2|...<cr>
//end second order group
```

LOI-45: If valued, OBR-11 (Specimen Action Code) **SHALL** be a value of 'A', 'G', 'L', or 'O'.

Conformance Statements: LAB_FRU_Component

LOI-47: The value of OBR-3 (Filler Order Number) **SHALL NOT** be valued identical to another instance of OBR-3 (Filler Order Number) in the message.

2.5.10.1. Result Handling and Result Copies To

In this implementation guide OBR-28 (Result Copies To) is populated with the identities of any providers to whom the ordering provider would like to send copies of the test result (copy-to providers). This is limited to five (5) Result Copies To.

While a method of identifying result copies has been provided in this specification, BOL are not obligated to comply with result copy requests when the lab is unable to validate the end point.

When OBR-28 is populated, additional information describing the address or other contact information of the copy-to provider(s) shall also be provided in the PRT segment. The number and sequence of the copy-to providers listed in the PRT segments shall match the number and sequence of the copy-to providers listed in the OBR-28 field of the preceding OBR segment.

2.5.11. NTE – Notes and Comments Segment

Table 19 - NTE – Notes and Comments Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID – NTE	SI	R	[1..1]		For the first repeat of the NTE segment, the sequence number shall be one (1), for the second repeat, the sequence number shall be two (2), etc.
2	Source of Comment		O			
3	Comment	FT	R	[1..*]		Comment contained in the segment.
4	Comment Type		O			

2.5.12. PRT – Participation Information Segment

In this guide, PRT shall only be used in support of Result Copies to as described in Section 2.5.10.1 Result Handling and Result Copies To; any other use is beyond the scope of this guide. Note this segment is from version 2.7.1.

Table 20 - PRT – Participation Information Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Participation Instance ID	EI	R	[1..1]		
2	Action Code	ID	R	[1..1]		Constrained to 'AD' from HL7 0287 Action Codes
3	Action Reason		O			
4	Participation	CWE_CR1	R	[1..1]		Constrained to 'RCT' from HL7 0912 Participation

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
5	Participation Person	XCN	R	[1..1]		Must include a valid StarLIMS Agency ID[4], the correct assigning authority (StarLIMS) for the identifier, as well as the provider's family/last name.
6	Participation Person Provider Type	CWE	O	[1..1]		
7	Participant Organization Unit Type	CWE	O	[1..1]		
8	Participation Organization	XON	O	[1..1]		
9	Participant Location	PL	O	[1..1]		
10	Participation Device	EI	O	[1..1]		
11	Participation Begin Date/Time (arrival time)	DTM	O	[1..1]		
12	Participation End Date/Time (departure time)	DTM	O	[1..1]		
13	Participation Qualitative Duration	CWE	O	[1..1]		
14	Participation Address	XAD	C(R/RE)	[0..1]		Condition Predicate: If PRT-15 is not valued.
15	Participant Telecommunication Address	XTN	RE	[0..5]		

Usage Note

If the proceeding OBR segment has three providers listed in OBR-28 (Results Copy To) field, then at least three PRT segments shall follow the OBR segment. **PRT segments MUST be in the same order as the order of providers listed in OBR-28.**

Conformance Statements: LOI_Common_Component

LOI-48: PRT-2 (Action Code) **SHALL** be valued with 'AD'.

LOI-49: For each value in OBR-28 (Result Copies To) a corresponding PRT (Participant Information) **SHALL** be present with PRT-4.1 (Participation Identifier) valued 'RCT'.

LOI-50: For each PRT (Participant Information) where PRT-4.1 (Participation Identifier) is valued 'RCT', there must be a corresponding value in OBR-28 (Result Copies To) equal to PRT-5 (Participation Person).

2.5.13. DG1 – Diagnosis Segment

DG1 Segment is required for all billable tests and is strongly encouraged for all others.

[4] Contact the DASH unit at 517-335-8059 to find StarLIMS Agency IDs.

Table 21 - DG1 – Diagnosis Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID - DG1	SI	R	[1..1]		
2	Diagnosis Coding Method		X			Excluded for this Implementation Guide.
3	Diagnosis Code - DG1	CWE_CR1	R	[1..1]	ICD-10CM	
4	Diagnosis Description		X			Excluded for this Implementation Guide.
5	Diagnosis Date/Time		O			
6	Diagnosis Type	IS	R	[1..1]	HL70052	
7	Major Diagnostic Category		X			Excluded for this Implementation Guide.
8	Diagnostic Related Group		X			Excluded for this Implementation Guide.
9	DRG Approval Indicator		X			Excluded for this Implementation Guide.
10	DRG Grouper Review Code		X			Excluded for this Implementation Guide.
11	Outlier Type		X			Excluded for this Implementation Guide.
12	Outlier Days		X			Excluded for this Implementation Guide.
13	Outlier Cost		X			Excluded for this Implementation Guide.
14	Grouper Version And Type		X			Excluded for this Implementation Guide.
15	Diagnosis Priority	ID	RE	[0..1]	HL70359	
16	Diagnosing Clinician		O			
17	Diagnosis Classification		O			
18	Confidential Indicator		O			
19	Attestation Date/Time		O			
20	Diagnosis Identifier	EI	C(R/O)	[1..1]		Condition Predicate: If MSH-9.2 contains 'P12'.
21	Diagnosis Action Code	ID	C(R/O)	[1..1]	HL70206	Condition Predicate: If MSH-9.2 contains 'P12'.

Usage Note

DG1-3 (Diagnosis Code - DG1)

The use of CWE is pre-adopted from HL7 V.2.7.1.

DG1-20 (Diagnosis Identifier) and DG1-21 (Diagnosis Action Code)

Note that the condition predicates on DG1-20 (Diagnosis Identifier) and DG1-21 (Diagnosis Action Code) will always yield 'Optional' as none of the Laboratory Order messages will contain 'P12' in MSH-9. These conditions are stated as per the base standard.

Conformance Statements: LOI_Common_Component

LOI-51: The value of DG1-1 (Set ID – DG1) **SHALL** be valued sequentially starting the value '1' within a given OBSERVATION_REQUEST segment group.

LOI-52: Only one instance of DG1-15 (Diagnosis Priority) in the message **SHALL** contain the value '1'.

Example Message for DG1-3

```
250.00^Diabetes mellitus type II or unspecified type, not stated as uncontrolled^I9C
```

2.5.14. OBX – Observation/Result Segment

Note: Components 26 through 29 are pre-adopted from Version 2.8.1

Table 22 - OBX – Observation/Result Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID – OBX	SI	R	[1..1]		For the first repeat of the OBX segment, the sequence number shall be one (1), for the second repeat, the sequence number shall be two (2), etc.
2	Value Type	ID	C(R/X)	[0..1]	HL70125 (constrained)	Condition Predicate: If OBX-5 (Observation Value) is valued. This field identifies the data type used for OBX-5.
3	Observation Identifier	CWE_CR	R	[1..1]	Logical Observation Identification Name and Codes (LOINC) and/or Local Codes	If used in the Prior Result group, LOINC shall be used as the standard coding system for this field if an appropriate LOINC code exists. If used for Asked at Order Entry (AOE), use correct local code. See Section 3.1.2 Asked at Order Entry (AOE) Observations for more details.
4	Observation Sub-ID	ST	C(R/O)	[0..1]		Condition Predicate: If there are multiple OBX segments associated with the same OBR or SPM segment that have the same OBX-3 (Observation Identifier) values for (OBX-3.1 (Identifier) and OBX-3.3 (Name of Coding System)) or (OBX-3.4 (Alternate Identifier) and OBX-3.6 (Name of Alternate Coding System)).
5	Observation Value	Varies	RE	[0..1]		Note: If value is coded, ST should not be valued in OBX-2. Allowable data types for this field are described in HL7 table 0125 (from OBX-2).
6	Units	CWE_CRE	C(R/O)	[0..1]		Condition Predicate: If OBX-2 (Value Type) is 'SN' or 'NM' Use of UCUM is required as the units when the data type in OBX-2 is 'SN' or 'NM'
7	References Range		O			
8	Abnormal Flags		O			
9	Probability		O			
10	Nature of Abnormal Test		O			
11	Observation Result Status		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
12	Effective Date of Reference Range		O			
13	User-Defined Access Checks		O			
14	Date/Time of the Observation	TS_5	C(R/O)	[0..1]		Condition Predicate: If OBX-5 is valued.
15	Producer's Reference		O			
16	Responsible Observer		O			
17	Observation Method		O			
18	Equipment Instance Identifier		O			
19	Date/Time of the Analysis		O			
20	Reserved for harmonization with Version 2.6.		X			Excluded for this Implementation Guide.
21	Reserved for harmonization with Version 2.6.		X			Excluded for this Implementation Guide.
22	Reserved for harmonization with Version 2.6.		X			Excluded for this Implementation Guide.
23	Performing Organization Name		O			
24	Performing Organization Address		O			
25	Performing Organization Medical Director		O			
26	Patient Results Release Category		O			
27	Root Cause		O			
28	Local Process Control		O			
29	Observation Type	ID	R		HL70936 (V2.8.1)	

Usage Note

When the OBX under the OBR is used it typically reflects responses to the AOEs.

OBX-3 (Observation Identifier)

The use of CWE in, OBX-5 (Observation Value) and OBX-6 (Units) is pre-adopted from HL7 V.2.7.1.

Conformance Statements: LOI_Common_Component

LOI-53: The value of OBX-5 (Observation Value) **SHALL NOT** be truncated.

LOI-54: The value of OBX-1 (Set ID – OBX) **SHALL** be valued sequentially starting the value '1' within a given segment group.

2.5.15. SPM – Specimen Segment

Table 23 - SPM – Specimen Segment

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
1	Set ID – SPM	SI	R	[1..1]		
2	Specimen ID	EIP	RE			
3	Specimen Parent IDs		O			
4	Specimen Type	CWE_CRE	R	[1..1]	SNOMED CT/Local	See the Laboratory Services Guide available on the BOL website for a list of valid specimen sources for each test. MDHHS BOL Specimen Source List
5	Specimen Type Modifier	CWE_CRE1	RE	[0..*]	HL70541	
6	Specimen Additives	CWE_CRE1	RE	[0..*]	HL70371	
7	Specimen Collection Method	CWE_CRE1	RE	[0..1]	HL70488	
8	Specimen Source Site	CWE_CRE	C(R/RE)	[0..1]	SNOMED CT Anatomical Hierarchy	Condition Predicate: Specimen Source Site is required to be populated for some tests. See the Laboratory Services Guide available of the BOL website for a listing of what tests require Specimen Source Site information.
9	Specimen Source Site Modifier	CWE_CRE1	C(RE/X)	[0..*]	HL70542	Condition Predicate: If SPM-8.3 (Name of Coding System) or SPM-8.6 (Alternate Coding System ID) is valued 'SCT'
10	Specimen Collection Site	CWE_CRE1	RE	[0..1]	HL70543	
11	Specimen Role		O			
12	Specimen Collection Amount		O			
13	Grouped Specimen Count		O			
14	Specimen Description		RE			
15	Specimen Handling Code		O			
16	Specimen Risk Code		O			
17	Specimen Collection Date/Time	DR_1	R	[1..1]		SPM-17.1 and SPM-17.2 must use TS_5 for the data type definition.
18	Specimen Received Date/Time		O			
19	Specimen Expiration Date/Time		O			
20	Specimen Availability		O			

SEQ	Element Name	DT	Usage	Cardinality	Value Set	Description/Comments
21	Specimen Reject Reason		O			
22	Specimen Quality		O			
23	Specimen Appropriateness		O			
24	Specimen Condition		O			
25	Specimen Current Quantity		O			
26	Number of Specimen Containers		O			
27	Container Type		O			
28	Container Condition		O			
29	Specimen Child Role		O			

Usage Note

If any of OBR-7 (Observation Date/Time), OBR-8 (Observation End Date/Time), SPM-17.1 (Range Start Date/Time) or SPM-17.2 (Range End Date/Time) contain time zone offset, then all must contain a time zone offset.

Conformance Statements: LOI_Common_Component

LOI-57: SPM-4.3 (Name of Coding System) **SHALL NOT** be valued with 'HL70353'.

LOI-58: SPM-4.6 (Name of Alternate Coding System) **SHALL NOT** be valued with 'HL70353'.

3. Special Cases and Error Conditions

3.1. Special Cases

3.1.1. Order Cancellation or Appending

Cancelling and appending an order is only supported **before** the specimen has been sent. After that, orders can only be changed or canceled by contacting the lab directly by calling DASH at 517-335-8059.

If appending an order before the specimen has been received, include the original order in the message.

3.1.2. Asked at Order Entry (AOE) Observations

Ask at Order Entry responses are recorded as observations that provide critical information for the calculation or interpretation of some lab results or to satisfy state and federal health agency mandated information gathering requirements, i.e., for blood lead testing. Many of the tests conducted by BOL require, if known, several Asked at Order Entry (AOE) observations. These are transmitted as OBXs. The most current Test list that require AOEs and the related AOE answers may be found on the Laboratory Services Guide website at http://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_5103_26138-362966--,00.html

Depending on the test that is being ordered, failure to provide AOE(s) may result in delays in testing, delays in results availability and follow-up from lab staff to collect the AOE information.

MDHHS Prior Approval AOE

MDHHS Prior Approval is provided after consultation with the MDHHS Bureau of Disease Control, Prevention and Epidemiology (517-335-8165) for tests that require them. Consult the Laboratory Services Guide at (http://www.michigan.gov/mdhhs/0,5885,7-339-71551_2945_5103_26138-362966--,00.html) for the most current BOL tests that require prior approval. Prior approval list to date:

- AFB Nucleic Acid Amplification
- Arbovirus Encep Panel (IgM)
- Arbovirus PRNT
- Bacillus anthracis – Clinical Specimen
- Botulism Toxin
- Brucella – Clinical Specimen
- Burkholderia – Clinical Specimen
- Coxiella burnetii – Clinical Specimen
- Ebola Virus
- Francisella tularensis – Clinical Specimen
- Measles IgM
- Mumps IgM
- Mumps PCR
- Norovirus PCR

- Novel Coronavirus 2012 (MERS-CoV)
- Pertussis Culture
- Poxvirus
- Rubella IgM
- Syphilis FTA – ABS DS
- Syphilis IgM Western Blot
- Toxic Shock Testing
- Yersinia pestis – Clinical Specimen

The "Name" data type is ST.

Table 24 - MDHHS Prior Approval AOE

Value	Description	Value Set	Comments
AOE01	MDHHS Prior Approval: Name	BOL_0002	

Free Text Response AOEs

Several of the AOEs answers are in free text and all have the data type of ST.

Table 25 - Free Text Response AOEs

Value	Description	Value Set	Related Test
AOE02	Comment/Other	BOL_0002	All Tests
AOE03	Organism Suspected	BOL_0002	All Tests
AOE04	Form Control Number	BOL_0002	C. trachomatis & N. gonorrhoeae Non-Culture - Prepaid
AOE05	Outbreak Identifier	BOL_0002	Enteric Bacterial Culture, Hepatitis A Antibody (IgM), Influenza (PCR/Culture), Norovirus PCR, Parasitology, Respiratory PCR Panel - Bacterial, Respiratory PCR Panel - Viral, Salmonella/Shigella Serotyping - Human
AOE06	Results of RTR – if done	BOL_0002	HIV Ag/Ab - Serum
AOE07	State/County/Country of Exposure	BOL_0002	Lyme Disease - EIA
AOE08	Symptoms (Specify)	BOL_0002	Lyme Disease - EIA
AOE09	Accounting Control #	BOL_0002	Student/Employee Immune Status Panel
AOE10	Duration of Lesion - # of	BOL_0002	Syphilis DFA
AOE11	Specify Site	BOL_0002	Syphilis DFA
AOE12	Results of RPR – if done	BOL_0002	Syphilis (USR test) + Syphilis TP-PA

Date Response AOEs

Several of the AOEs answers are in free text and all have the data type of TS_5.

Table 26 - Date Response AOEs

Value	Description	Value Set	Related Test
AOE13	Onset Date	BOL_0002	All Tests
AOE14	Date of Last Influenza Vaccination	BOL_0002	Influenza (PCR/Culture)
AOE15	Date of Last Rabies Vaccination	BOL_0002	Rabies Ab Serology

Limited Response AOEs

Several of the AOEs answers are from a limited value set. These are sent in the data type of ST but are constrained to the answers in the table below. Note possible answers are separated by commas and are case-sensitive (must be in UPPER CASE).

Table 27 - Limited Response AOEs

Value	Description	Value Set	Answers	Related Test
AOE16	Growth	BOL_0002	AEROBE, MICROAEROPHILE	Aerobic Isolate ID
AOE17	Dextrose	BOL_0002	OXIDATION, FERMENTATION	Aerobic Isolate ID
AOE18	Catalase	BOL_0002	POSITIVE, NEGATIVE	Aerobic Isolate ID
AOE19	Gram Stain	BOL_0002	POSITIVE, NEGATIVE	Aerobic Isolate ID
AOE20	MacConkey	BOL_0002	POSITIVE, NEGATIVE	Aerobic Isolate ID
AOE21	Oxidase	BOL_0002	POSITIVE, NEGATIVE	Aerobic Isolate ID
AOE22	Gram Stain - Shape	BOL_0002	VARIABLE, ROD, COCCUS, DIPLOCOCCUS	Aerobic Isolate ID
AOE23	Gender of Sex Partner in last year	BOL_0002	MALE, FEMALE, BOTH MALE AND FEMALE	C. trachomatis & N. gonorrhoeae Non-Culture
AOE24	Justification	BOL_0002	UNINSURED, UNDERINSURED, CONFIDENTIAL SERVICES	C. trachomatis & N. gonorrhoeae Non-Culture
AOE25	Pregnant?	BOL_0002	YES, NO	C. trachomatis & N. gonorrhoeae Non-Culture, All Hepatitis tests, All HIV tests, All Syphilis tests
AOE26	Indications for Testing	BOL_0002	EXPOSURE TO SOMEONE WITH HEPATITIS B	Hepatitis B Surface Antigen (HBsAg) – Exposure, Hepatitis B Surface Antigen (HBsAg) – Pregnancy
AOE27	Type of Last Influenza Vaccination	BOL_0002	FLU MIST, TRIVALENT (SHOT), OTHER	Influenza (PCR/Culture)
AOE28	Early Disease: Erythema Migrans (5 cm at least in diameter)	BOL_0002	Y, N	Lyme Disease - EIA
AOE29	Late Disease: Neurologic?	BOL_0002	Y, N	Lyme Disease - EIA
AOE30	Late Disease: Cardiologic?	BOL_0002	Y, N	Lyme Disease - EIA
AOE31	Late Disease:	BOL_0002	Y, N	Lyme Disease - EIA

Value	Description	Value Set	Answers	Related Test
	Rheumatologic?			
AOE32	Symptoms (Example – Rash, Fever, Headache, Joint Pain)?	BOL_0002	Y, N	Lyme Disease - EIA
AOE33	Serum Status	BOL_0002	ACUTE, CONVALESCENT	Serology Tests
AOE34	Duration of Lesion - time period	BOL_0002	DAYS, MONTHS, YEARS	Syphilis DFA
AOE35	Patient Occupation	BOL_0002	MEDICAL STUDENT, NURSING STUDENT, HEALTH CARE WORKER, OTHER	Student/Employee Immune Status Panel

Example:

```
OBX|1|NM|AOE34^Duration of Lesion - time period^BOL_0002||5|mo^month^UCUM|...
```

3.1.3. Results Copied To

This guide supports the use of OBR-28 (Result Copies To). Both OBR-28 and a corresponding PRT segment are required for each Result Copies To destination. Result Copies To destinations are limited to 5. Submitters are required to properly identify the destination, ensure that they have a legal right to see the results, and notify the destination that results may be coming. BOL will make every effort to deliver results to each Result Copies To destination in the message, but if the destination cannot be located or contacted by BOL staff, results may NOT be sent. Submitters are strongly encouraged to have any destination contact the BOL at the information listed in Section 1.5 MDHHS Point of Contact prior to including the destination in any orders. Destinations should also be listed in the MiHIN Health Provider Directory (HPD) with full contact information. Destinations are also encouraged to have populated the MiHIN HPD with Electronic Services Information (ESI) for lab results; this will allow for HL7 delivery of results for the destination.

PRT segments MUST be in the same order as the order of providers listed in OBR-28.

See Sections 2.5.10 OBR – Observation Request Segment, 2.5.12 PRT – Participation Information Segment and XCN – Extended Composite ID Number and Name for Persons for more details.

3.1.4. Test Referred to CDC for Testing

For orders that get referred to the CDC for testing, HL7 orders are accepted, but the paper copy of the "CDC Test Request Form" is required to accompany the specimen(s) or sent via fax. Also, HL7 results are NOT available for specimens tested at the CDC.

3.1.5. Prior Results

Some of the tests conducted by BOL require, if known, prior related results. See the Laboratory Services Guide available of the BOL website for more information on what tests should include prior results.

3.1.6. Confidential Testing

Although all tests results are considered confidential, some of the tests conducted by BOL require, by Michigan law, additional confidentiality, and will not be submitted to insurance for billing. These can include sexually transmitted diseases on minors and HIV related tests. See the Laboratory Services Guide available on the BOL website for more information on what tests this additional confidentiality applies to. To indicate an order is being submitted for

confidential testing, Release Information Code (IN1-27) shall be populated with an 'N'. These orders will not be submitted to insurance or billed. Note, submitter is responsible for any fees related to confidential test.

3.1.7. Multiple Orders

You should only order multiple tests against an order if the same **physical** sample is being used to complete those tests. For example, if Patient A requires Syphilis (USR) and Chlamydia/N. gonnorrhoeae testing, and you have collected a serum and urine sample, then two separate orders need to be created. On the other hand, if Patient A requires Syphilis (USR) and HIV Ag/Ab Serum, and you have collected a serum sample, then both of these tests can be ordered against the same order. *For example* with one ORC|1 and Two OBR|1. OBR|2 and one SPM|1

```
MSH|...<cr>
PID|1|...<cr>
ORC|1|...<cr>
OBR|1|...<cr>
OBR|2|...<cr>
SPM|1|...<cr>
```

3.1.8. Anonymous Testing

Anonymous testing is allowed for HIV-related tests, but the specimen must be labeled with at least a unique identifier, i.e. ADAP#. For ADAP-related testing, PID-18 must be populated with the ADAP number/ID. In these cases Release Information Code (IN1-27) shall be populated with an 'N' (see section 3.1.6), and the patient's first name should be set to '`testing`' and last name set to '`anonymous`' in PID-5. It is also recommend that no NK1 segments are sent with the order. See the Laboratory Services Guide available of the BOL website for more information on what tests this anonymous testing applies to.

3.2. Error Conditions

This section describes the error conditions that might happen, related message acknowledgments, and expected or required actions of the submitter. BOL's default is to ACK all messages, even successful messages.

See APPENDIX F - Error Conditions and Related Codes for a full listing of error codes and related information.

In the cases where a message was not completely successful, the submitter will receive an ACK with an 'AE' or 'AR' Acknowledgment Code. Table 28 below outlines the various error connections and corresponding Acknowledgment Code (MSA-1) and Error Codes (ERR-3). Any message that receives an Acknowledgment Code of "AR" *will* require error handling. Any message that receives and Acknowledgment Code of "AE" and Severity (ERR-4) of "E" *will* require error handling. Any message that receives and Acknowledgment Code of "AE" and Severity (ERR-4) of "W" or "I" may require error handling. See below for more details.

Table 28 - Example Error Conditions and Related MSA and ERR Codes

Error Condition	MSA-1	ERR-3[5]
Missing Required Segment	AR or AE	100
Missing Required Field	AR or AE	101

[5] This is a combination of the HL7 Table 0357 and additional HIE-related (MiHIN) error codes.

Data Type Error	AR or AE	102
Wrong Message Type	AR	200
Unsupported Event Code	AR	201
Unsupported HL7 Version ID	AR	203
Unknown Key Identifier	AR	204
Application Internal Error	AR or AE	207
Application Unavailable	AR	900
Application Down for Planned Maintenance	AR	901
Unauthorized Submitter	AR	952

3.2.1. Successful Messages – AA

Any message that receives an Acknowledgment Code of "AA" is considered a successful message, and no error handling is needed.

3.2.2. Non-Fatal Processing Errors – AE

Any message that receives an Acknowledgment Code of "AE" is considered to have a non-fatal processing error(s) and *may* require error handling. All "AE" messages should be investigated by the original sender. Any message with an ERR-4 Severity of "E" or error must be investigated. This means the transaction was unsuccessful, and the receiving system did NOT receive required information. Note that most "AE" messages will have a severity of "I" or "W". Most severity "E" messages are addressed during the testing and onboarding processes. For sending systems that do not support the ERR segment, all "AE" messages should be investigated, as there is no way to determine severity. It is strongly recommend to utilize the ERR segment.

In some cases "AE" messages may be able to be remediated out-of-band through some human or third-party data quality tool.

3.2.3. Fatal Processing Errors – AR

Any message that receives an Acknowledgment Code of "AR" is considered to have a fatal processing error (s) and *will* require error handling. All "AR" messages require some level of error handling, but in some cases it can be automated. For example, if a receiving system is down, an automatic re-transmission after 10 minutes is appropriate. See System Unresponsive – Special Case below for more details.

If there are any errors, especially in the MSH, PID, and required OBX segments, then the message is rejected, and MDHHS will respond with an ACK error message.

Examples of issues that may cause a message to be rejected include:

- Message violates HL7 2.5.1 standard.
- Message is missing required field or segment.
- Value is not valid for the given type (i.e. there is an alphanumeric data value in a date field) or is not a recognized valid value.
- Value is inconsistent with other values given in the same message.

3.2.4. System Unresponsive – Special Case

Since these messages will flow though HIEs and include multiple hops, a special error case is needed if the intermediary hops are available but the end destination is not. In this case an ACK with AR and a special unresponsive ERR-3 Error Code and MSA-3 Text Message entries are used. It is recommended that the sending system retransmit the message once every ten (10) minutes until it receives a responsive ACK. The special unresponsive ERR-3 Error Code and MSA-3 Text Message entries are any items listed in Table 46 - HL7 Table 0357 – Message Error Condition Codes. This currently includes 900 "Receiving system unresponsive" and 901 "Receiving system down for maintenance." In some cases the HIE will already handle this error; contact your HIE for more information.

3.3. Health Information Exchanges (HIE) and Related Requirements

3.3.1. Message Header Validation

Health Information Exchanges or other intermediaries should evaluate the message header for required fields before submission to the State.

Table 29 - Message Header Validation

MSH Field	Field Name	Requirements
MSH-4	Sending Facility	Must be populated with an OID
MSH-5	Receiving Application	Must be populated with one of the values from Table 7 - MSH-5 (Receiving Application) Values
MSH-6	Receiving Facility	Must be populated with 'MDHHS^2.16.840.1.114222.4.3.2.2.3.161.1^ISO'
MSH-11	Processing ID	"T" (training or testing) or "P" (production). See Section 4.2 "On-boarding Instructions" for details on this field during the on boarding process.
MSH-12	Version ID	Must be populated with 2.5.1

3.3.2. ACK Messages Handling

Health Information Exchanges or other intermediaries will receive ACK messages from MDHHS and shall return these messages back to the provider site that submitted them to MDHHS. The return of all ACK messages, including 'AA' messages, is required. In cases where returning the ACK to the original sender site would cause undue harm, this requirement can be waved on a case by case basis.

4. Message Transport and On Boarding

4.1. Message Transport Options

Messages must be sent through Michigan's Health Information Exchange (HIE) infrastructure or other MDHHS approved methods to MDHHS's Data Hub. Michigan's HIE infrastructure includes the Michigan Health Information Network (MiHIN) Shared Services and its related Health Information Exchanges (a.k.a., Qualified Organizations). To learn more, visit http://mihin.org/exchanges/. For additional information, contact the staff listed in Section 1.5 "MDHHS Point of Contact".

Out-of-state providers may use the HIE infrastructure or contact the staff listed in Section 1.5 "MDHHS Point of

Contact" for other options.

4.2. On-boarding Instructions

The on-boarding process is designed to ensure that all messages are complete and of good quality prior to allowing a new submitter to enter into production. It is a multi-step process described below.

4.2.1. Pre-Production Onboarding

Prior to entering into full production, submitters are required to go through a data/message quality phase for Pre-Production Onboarding. During this phase, real messages are sent, just as in production, but MSH-11 "Processing ID" is to be set to the literal value of "T". Messages are reviewed for completeness and quality by BOL staff. Only after correcting any quality issues with the message are submitters allowed to enter full production. During Pre-Production Onboarding, submitters may be required to report BOL items via a different process. All Pre-Production Onboarding must be coordinated with BOL staff. Contact the BOL staff listed in Section 1.5 "MDHHS Point of Contact" to start pre-production testing and onboarding.

4.2.2. Production

Once a submitter has completed Pre-Production Onboarding and received the approval to enter into production from BOL staff, they must change MSH-11 "Processing ID" to be set to the literal value of "P". **Submitters are advised to include this requirement in any internal project scope or contract with an external organization conducting the configuration of the HL7 interface.**

4.2.3. Testing After Entering into Production

If for any reason a submitter wishes to test messages after entering into production (i.e., during an EHR upgrade), they may request an additional round of Pre-Production Onboarding testing. This must be coordinated with BOL staff, and the MSH-11 "Processing ID" must be set to the literal value of "T" for any test message. Production messaging can continue during additional rounds of Pre-Production Onboarding testing as long as the MSH-11 "Processing ID" is set to the literal value of "P" for production messages, and BOL staff have approved.

4.2.4. Required Retesting

Submitters are required to go through Pre-Production Onboarding retesting when switching from one EHR or interface engine product to another. Submitters are encouraged to undergo Pre-Production Onboarding retesting for any major EHR or interface engine version upgrade. All retesting must be coordinated with BOL staff.

5. Code Systems and Value Sets

Successful message implementation requires that transmitted messages (message instances) contain valid values for coded fields. It is important to note that code sets are relatively dynamic and subject to change between publications of these implementation guides.

Every code value passed in a message instance is drawn from a code system that either may have a globally unique identifier, such as an OID, an HL7 identifier (Table 0396), or a locally defined identifier. In general, the coded values allowed in a field (a) may be drawn from more than one code system, and (b) may be a subset of the codes from a given coding system. Combining (a) and (b) makes it possible for the allowed coded value to be a combination of multiple subsets drawn from multiple coding systems. In most cases, only subsets of the codes defined in a code system are allowed for use in a particular message.

The subsets of the codes that are allowed for a particular field are identified by a construct known as a "value set". A value set is a collection of coded values drawn from code systems. Value sets serve to identify the specific set of coded values for the message from the universe of coded values across all coding systems.

The segment tables in previous sections identify the value set or coding system used for each supported field containing a coded value. Some of these pre-coordinated value sets must be updated, or new ones created, as new needs are identified.

A unique identifier in an ISO compliant OID format identifies each individual value set, but this identifier is not transmitted in the message. The identifier or code for the coding system from which the value is derived is sent in the message. However, the value set identifier is useful and important when vocabulary items are modified or replaced.

5.1.LOINC

Every code value passed in OBX-3 (Observation Identifier) and OBR-4 (Universal Service Identifier) is drawn from a code system that may have either a globally unique identifier, such as the Logical Observation Identifiers Names and Codes (LOINC) vocabulary value set, or a locally defined identifier (local test code).

The laboratory's local test code and coding system shall be sent to identify the order, and the test name should be sent. In addition, LOINC shall be used as the standard vocabulary to identify the ordered test in the Universal Service Identifier (OBR-4) when an applicable LOINC code is available and identified by the laboratory. If an appropriate orderable LOINC code is provided by the laboratory (i.e. in its electronic Directory of Service/Test Compendium [eDOS]), it SHOULD be sent along with a LOINC test description as defined in the published LOINC specification. When no valid orderable LOINC code exists, the local code may be the only code sent.

Notes:

1. The LOINC Common Laboratory Orders Value Set is available and can be used as a 'starter set' for mapping commonly used laboratory orders. It does not attempt to include all possible laboratory order codes. For additional information on LOINC Common Laboratory Orders Value Set, refer to www.loinc.org/usage/orders.
2. The sender shall always populate the first triplet before populating other triplets; the receiver shall examine all triplets to find relevant values. A triplet consists of three components: the code, the text description of

the code, and the code system name. When populating the 3rd component to indicate the laboratory's local test order code, the name of the coding system SHOULD be formatted "99zzz", where zzz is replaced by an alphanumeric character sequence that identifies the lab. The use of "L" is also allowed. If a LOINC code is sent as an identifier, the name of the coding system shall be "LN".

3. Universal Service Identifier is a required field in the OBR segment. However, the values transmitted by the order placer in this field for an order message may not be the same values placed in this field of a generated result message created by an order filler.

Examples:

An order for a basic metabolic panel test consisting of both the laboratory's local order code and the corresponding LOINC order code

```
|BMP^Basic Metabolic Panel^99LAB^24321-2^Bas Metab 2000 Pnl
SerP^LN^20120731^2.40|
```

An order for a cancer antigen blood test using only the laboratory's local order code

```
|CA125^CA-125^99LAB^^^^20120731|
```

For further information on LOINC and access to tools, please visit http://loinc.org/

5.2.SNOMED CT

SNOMED CT is a recommended vocabulary as specified throughout this guide, i.e., for specimen source terms in SPM-4 (Specimen type) when a SNOMED CT code is available. Pending the outcome of successful pilot testing, the workgroup anticipates that SNOMED CT would be the required vocabulary for specimen type/source concepts in the long term.

Note that in some instances, a code must be drawn from a declared hierarchy in SNOMED CT, i.e., SPM-4 (Specimen type); terms should be drawn from the "specimen hierarchy"; see the field comments wherever SNOMED CT is identified as the value set.

Support for SNOMED CT shall include the code and the description text as described by IHTSDO. Further information on SNOMED CT can be found at the National Library of Medicine (http://www.nlm.nih.gov/research/umls/Snomed/snomed_main.html).

5.3.UCUM

Use of UCUM is recommended as one of the delivered units (could be in addition to the local units). For dimensionless units the UCUM representation {any string} can be used, i.e., for a titer the UCUM representation is {titer}^titer^UCUM.

A table of commonly used example UCUM units for electronic messaging is available here: http://loinc.org/downloads/usage/units. Further information on UCUM can be found at: http://unitsofmeasure.org/

5.4.Unconstrained Code Systems

This section provides a list of unconstrained code systems and value sets used in this IG; refer to the base standard. It also provides information about the source of the vocabulary. The name found in the Value Set column corresponds

with the value set identified in the Value Set column of the data type and segment attribute tables in this guide.

Table 30 - Unconstrained Code System Summary

Name	Value Set	Source	Comments
Administrative Sex	HL70001	HL7 Version 2.5.1	
Patient Class	HL70004	HL7 Version 2.5.1	
Race Category	HL70005	HL7 Version 2.5.1	
Acknowledgment Code	HL70008	HL7 Version 2.5.1	
Diagnosis Type	HL70052	HL7 Version 2.5.1	
Relationship	HL70063	HL7 Version 2.5.1	
Processing ID	HL70103	HL7 Version 2.5.1	
Contact Role	HL70131	HL7 Version 2.5.1	
Yes/No Indicator	HL70136	HL7 Version 2.5.1	
Accept/Application Acknowledgment Condition	HL70155	HL7 Version 2.5.1	
Ethnic Group	HL70189	HL7 Version 2.5.1	
Address Type	HL70190	HL7 Version 2.5.1	
Telecommunication equipment type	HL70202	HL7 Version 2.5.1	
Segment Action Code	HL70206	HL7 Version 2.5.1	
Advanced Beneficiary Notice Code	HL70339	HL7 Version 2.5.1	Represents the minimum required set of values supported by this IG; the set can be expanded.
CWE Status Codes	HL70353	HL7 Version 2.5.1	This table is not constrained for this implementation guide. It is however constrained on where the table can be used. Table HL70353 can be used for coded values except for elements OBX-5 and SPM-4.
Message Error Condition Codes	HL70357	HL7 Version 2.5.1	
Diagnosis Priority	HL70359	HL7 Version 2.5.1	
Application	HL70361	HL7 Version 2.5.1	User defined; there are no suggested values.
Facility	HL70362	HL7 Version 2.5.1	User defined; there are no suggested values.
Additive/Preservative	HL70371	HL7 Version 2.5.1	
Country Value Set	HL70399	HL7 Version 2.5.1	This identifies the codes for the representation of names of countries, territories and areas of geographical interest. Use 3-character (alphabetic) form of ISO 3166 for HL7 Table 0399 as defined in HL7 Chapter 2, Section 2.15.9.17. The complete set of 3166-1 codes is available at http://www.iso.org/iso/home/standards/country_codes.htm
Specimen Collection Method	HL70488	HL7 Version 2.5.1	
Error severity	HL70516	HL7 Version 2.5.1	
Specimen Source Type Modifier	HL70542	HL7 Version 2.5.1	
Specimen Collection Site	HL70543	HL7 Version 2.5.1	
Relevant Clinical Information	HL70916	HL7 Version 2.7.1	User defined.
Observation Type	HL70936	HL7 Version 2.8.1	
County	FIPS 6-4		Codes representing county of origin, address county, reporting county.
Logical Observation Identifiers Names and Codes	LOINC	LOINC	http://www.loinc.org

Name	Value Set	Source	Comments
National Provider Identifier	NPI	NPI	NPI Search
SNOMED CT		SNOMED CT	http://www.nlm.nih.gov/research/umls/Snomed/snomed_main.html
Specimen Type	SNOMED CT and/or HL70487	SNOMED CT HL7 Version 2.7.1	Either HL70487 or SNOMED CT Specimen hierarchy may be used. It should be noted that in the future, SNOMED CT Specimen hierarchy may become the only recommended value set so trading partners should consider moving in that direction.
State Value Set	USPS	USPS	Identifies addresses within the United States are recorded using the USPS two-letter alphabetic codes for the State, District of Columbia, or an outlying area of the United States or associated area. See http://pe.usps.com/text/pub28/28apb.htm

5.5.Constrained HL7 Tables – Value Sets

This section provides a list of the modified code systems and value sets based on HL7 defined tables used in this IG. Modifications are either constraints or additions to HL7 tables by pre-adopting future versions of the tables. The name found in the Value Set column corresponds with the value set identified in the Value Set column of the data type and segment attribute tables found above.

Table 31 - Constrained Code System Summary

Name	Value Set	Source	Comments
Specimen Action Code	HL70065	HL7 Version 2.7.1	
Message Type	HL70076	HL7 Version 2.5.1	
Order Control Codes	HL70119	HL7 Version 2.8.1	
Value Type	HL70125	HL7 Version 2.5.1	Use requires agreement between trading partners.
Name type	HL70200	HL7 Version 2.5.1	
Action Code	HL70287	HL7 Version 2.5.1	
Universal ID type	HL70301	HL7 Version 2.7.1	
Message structure	HL70354	HL7 Version 2.5.1	

5.5.1. HL7 TABLE 0065 – Specimen Action Code (V2.7.1)

Table 32 - HL7 TABLE 0065 – Specimen Action Code

Value	Description	Usage	Comment
A	Add ordered tests to the existing specimen	R	
G	Generated order; reflex order	R	
L	Lab to obtain specimen from patient	R	
O	Specimen obtained by service other than Lab	R	
P	Pending specimen; order sent prior to delivery	R	
R	Revised order	R	
S	Schedule the tests specified below	R	

5.5.2. HL7 TABLE 0076 – Message Type

Table 33 - HL7 TABLE 0076 – Message Type

Value	Description	Comment
OML	Unsolicited transmission of an observation message	
ACK	General acknowledgment message	

5.5.3. HL7 TABLE 0119 – Order Control Codes (V2.8.1)

Table 34 - HL7 TABLE 0119 – Order Control Codes

Value	Description	Usage	Comment
CA	Cancel order/service request		
CR	Canceled as requested		
NR	Notification Received		
NW	New order/service		
OC	Order/service canceled		
OK	Order/service accepted & OK		
OP	Notification of order for outside dispense		
UA	Unable to accept order/service		
UC	Unable to cancel		
UX	Unable to change		
XO	Change order/service request		
XR	Changed as requested		

5.5.4. HL7 TABLE 0125 – Value Type

Table 35 - HL7 TABLE 0125 – Value Type

Value	Description	Usage	Data Type	Comment
CE	Coded Entry	R		When sending text data in OBX-5, use either the ST, TX or FT data types.
CWE	Coded with Exceptions	R		Data type to be used where it is important to communicate the coding system and coding system version with the coded result being reported. Pre-adopted from Version 2.6. This Implementation Guide has constrained versions of the CWE data type; see APPENDIX B - Data Types. The CWE_CR format shall be used for OBX-5. When sending text data in OBX-5, use the ST, TX or FT data types.
CX	Extended Composite ID With Check Digit	O	Varies	Use the appropriate CX flavor (CX-GU or CX-NG or base standard) depending on the format of the observation value. Note: OBX-2/OBX-5 are not subject to the GU and NG profile components; different observations may require different data type flavors; therefore it is up to the trading partners to manage proper valuation and validation.
DT	Date	R		
ED	Encapsulated Data	O		When using the Source Application ID component, it should use the HD data type formatting considerations outlined in the base standard, not the constrained HD definitions in this IG.
FT	Formatted Text (Display)	R		Field using the FT data type to carry a text result value. This is intended for display. The text may contain formatting escape sequences as described in APPENDIX B - Data Types. Numeric results and numeric results with units of measure should not be reported as text. These should be reported as NM or SN numeric results, with the units of measure in OBX-6.
NM	Numeric	R		Field using the NM data type to carry a numeric result value. The only non-numeric characters allowed in this field are a leading plus (+) or minus (-) sign. The structured numeric (SN) data type should be used for conveying inequalities, ranges, ratios, etc. The units for the numeric value should be reported in OBX-6. Use of UCUM is

				recommended as one of the delivered units (could be in addition to the local units).
RP	Reference Pointer	O		When using the Application ID component it should use the HD data type formatting considerations outlined in the base standard, not the constrained HD definitions in this IG.
SN	Structured Numeric	R		Field using the SN data type to carry a structured numeric result value. Structured numeric include intervals (^0^-^1), ratios (^1^/^2 or ^1^:^2), inequalities (<^10), or categorical results (2^+). The units for the structured numeric value should be reported in OBX-6. Use of UCUM is recommended as one of the delivered units (could be in addition to the local units).
ST	String Data	R		Field using the ST data type to carry a short text result value. Numeric results and numeric results with units of measure should not be reported as text. These shall be reported as NM or SN numeric results, with the units of measure in OBX-6.
TM	Time	R		The time zone offset shall adhere to the use of the TimeZone Offset profile.
TS	Time Stamp (Date & Time)	R	TS_0	The time zone offset shall adhere to the use of the TimeZone Offset profile and associated discussion if the granularity involves hh or 'more'.
TX	Text Data (Display)	R		Field using the TX data type to carry a text result value that is intended for display. Numeric results and numeric results with units of measure should not be reported as text. These should be reported as NM or SN numeric results, with the units of measure in OBX-6.

5.5.5. HL7 TABLE 0200 – Name Type

Table 36 - HL7 TABLE 0200 – Name Type

Value	Description	Comment
L	Legal Name	
S	Coded Pseudo-Name to ensure anonymity	
U	Unspecified	

5.5.6. HL7 TABLE 0301 – Universal Id Type (V2.7.1)

Table 37 - HL7 TABLE 0301 – Universal Id Type

Value	Description	Usage	Comments
CLIA	Clinical Laboratory Improvement Amendments. Allows for the ability to designate organization identifier as a "CLIA" assigned number (for labs)	RE	
DNS	An Internet dotted name. Either in ASCII or as integers	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
GUID	Same as UUID.	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
HCD	The CEN Healthcare Coding Scheme Designator. (Identifiers used in DICOM follow this assignment scheme.)	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
HL7	Reserved for future HL7 registration schemes	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
ISO	An International Standards Organization Object Identifier	R	Used as the Universal ID Type in the CNN, EI and HD data types.

Value	Description	Usage	Comments
L,M,N	These are reserved for locally defined coding schemes.	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
Random	Usually a base64 encoded string of random bits. The uniqueness depends on the length of the bits. Mail systems often generate ASCII string unique names from a combination of random bits and system names. Obviously, such identifiers will not be constrained to the base64 character set.	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
URI	Uniform Resource Identifier	R	Used as the Universal ID Type in the RP data type.
UUID	The DCE Universal Unique Identifier	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
x400	An X.400 MSH format identifier	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.
x500	An X.500 directory name	C(X/O)	Condition Predicate: If Component GU is used on the field using this value set.

5.5.7. HL7 TABLE 0354 – Message Structure

Table 38 - HL7 TABLE 0354 – Message Structure

Value	Description	Usage	Comments
OML_O21	Unsolicited transmission of an observation message	R	Required for Profiles: LOI_GU_PRU_Profile LOI_GU_PRN_Profile LOI_NG_PRU_Profile LOI_NG_PRN_Profile
ACK	General Acknowledgment Message for unsolicited transmission of an observation message	R	Required for Profiles: LOI_Acknowledgement_Component GU_Acknowledgement_Component NG_Acknowledgement_Component

5.6.User-Defined HL7 Tables and Extended Value Sets

This section provides a list of the user defined HL7 tables as well as other code systems and value sets used in this IG; extensions are also noted here. It also provides information about the source of the vocabulary and an identifier for the vocabulary. The name found in the Value Set column corresponds with the value set identified in the Value Set column of the data type and segment attribute tables found above.

Note: In some cases the tables below represent extensions to the user defined HL7 table in the underlying standard and only the extensions to the base are provided, not the entire vocabulary.

Table 39 - User Defined or Extended Code System Summary

Name	Value Set	Source	Comments
Courtesy Code	HL70045	HL7 Version 2.5.1	
Financial Class	HL70064	HL7 Version 2.5.1	
Guarantor Type	HL70068	HL7 Version 2.5.1	
Insurance Plan ID	HL70072	HL7 Version 2.5.1	
Agreement Code	HL70098	HL7 Version 2.5.1	All of the values defined in the base plus one custom value (W).
Identifier Type	HL70203	HL7 Version 2.7.1	All of the values defined in the base plus two custom values (HPID and OEID).

Name	Value Set	Source	Comments
Coding Systems	HL70396	HL7 Version 2.5.1	HL7 Table 0396 defines the standard coding systems recognized by HL7. The table defines a mechanism by which locally defined codes can be transmitted. Any code/coding system not defined in HL7 Table 0396 is considered a "local" coding system from the HL7 perspective. Coding systems that are identified in this implementation guide will be identified according to the recommended HL7 nomenclature from table 0396 as "99-zzz" where "zzz" represents a string identifying the specific non-standard coding system. HL7 now maintains HL7 table 0396 "real time". This means that values may be added to the table at any time so that implementers can have an up-to-date source of truth for the codes to be used to identify coding systems in any 2.x message. See http://www.hl7.org/special/committees/vocab/table_0396/index.cfm
Priority	HL70485	HL7 Version 2.7.1	All of the values defined in the base plus one custom value (F).
Observation Result Handling	HL70507	HL7 Version 2.7.1	
Advanced Beneficiary Notice Override Reason	HL70552	HL7 Version 2.5.1	No Suggested Values
Specimen Type Modifier	SNOMED CT	SNOMED CT	A constrained SNOMED CT value set for this field is under development.

5.6.1. HL7 TABLE 0068 – Guarantor Type Code

Table 40 - HL7 TABLE 0068 – Guarantor Type Code

Value	Description	Usage	Comment
C	Client Guarantor		
P	Patient Guarantor		

5.6.2. HL7 TABLE 0098 – Agreement Code

All of the values in this code set are supported with the addition of the values in the table below.

Table 41 - HL7 TABLE 0098 – Agreement Code

Value	Description	Usage	Comment
W	Workman's Compensation		

5.6.3. HL7 TABLE 0203 – Identifier Type Code (2.7.1)

All of the values in this code set are supported with the addition of the values in the table below.

Table 42 - HL7 TABLE 0203 – Identifier Type Code

Value	Description	Usage	Comment
HPID	Health Plan Identifier		
OEID	Other Entity Identifier		

5.6.4. HL7 TABLE 0396 – Coding Systems Code

All of the values in this code set are supported with the addition of the values in the table below.

Table 43 - HL7 TABLE 0396 – Coding Systems Code

Value	Description	Usage	Comment

I10C	ICD-10CM

5.6.5. HL7 TABLE 0485 – Priority Code (V2.7.1)

Table 44 - HL7 TABLE 0485 – Priority Code

Value	Description	Comment
A	Fill after S orders	
C	callback	
P	preop	
PRN	as needed	
R	Default	
S	With highest priority	
T	A request implying that it is critical to come as close as possible to the requested time (e.g. for a trough anti-microbial level)	
TD <integer>	Timing critical within <integer> days	
TH <integer>	Timing critical within <integer> hours	
TL <integer>	Timing critical within <integer> months	
TM <integer>	Timing critical within <integer> minutes	
TS <integer>	Timing critical within <integer> seconds	
TW <integer>	Timing critical within <integer> weeks	
~~F~~	~~Future Order~~	Not supported at this time

5.6.6. HL7 TABLE 0507 – Observation Result Handling (V2.7.1)

Table 45 - HL7 TABLE 0507 – Observation Result Handling

Value	Description	Comments
~~N~~	~~Notify provider when ready~~	Not supported in this IG, BOL will ignore Result Handling (OBR-49) and always send results to all orders.
~~A~~	~~Alert provider when abnormal~~	Not supported in this IG, BOL will ignore Result Handling (OBR-49) and always send results to all orders.

5.6.7. HL7 Table 0357 – Message Error Condition Codes

Table 46 - HL7 Table 0357 – Message Error Condition Codes

Value ERR-3^1	Description ERR-3^2 & MSA-3	Comment ERR3^9 & ERR8	Code Set ERR3^3	Typical Severity
0	Message accepted	Success. Optional, as the AA conveys success. Used for systems that must always return a status code.	HL70357	NOT USED
100	Segment sequence error	Error: The message segments were not in the proper order, or required segments are missing.	HL70357	E
101	Required field missing	Error: A required field is missing from a segment	HL70357	E
102	Data type error	Error: The field contained data of the wrong data type, e.g., an NM field contained "FOO".	HL70357	E
103	Table value not found	Error: A field of data type ID or IS was compared against the corresponding table, and no match was found.	HL70357	Varies
200	Unsupported message type	Rejection: The Message Type is not supported.	HL70357	E
201	Unsupported event code	Rejection: The Event Code is not supported.	HL70357	E
202	Unsupported processing id	Rejection: The Processing ID is not supported.	HL70357	E

Value ERR-3^1	Description ERR-3^2 & MSA-3	Comment ERR3^9 & ERR8	Code Set ERR3^3	Typical Severity
203	Unsupported version id	Rejection: The Version ID is not supported.	HL70357	Varies
204	Unknown key identifier	Rejection: The ID of the patient, order, etc., was not found. Used for transactions other than additions, i.e., transfer of a non-existent patient.	HL70357	E
205	Duplicate key identifier	Rejection: The ID of the patient, order, etc., already exists. Used in response to addition transactions (Admit, New Order, etc.).	HL70357	Varies
206	Application record locked	Rejection: The transaction could not be performed at the application storage level, i.e., database locked.	HL70357	E
207	Application internal error	Rejection: A catchall for internal errors not explicitly covered by other codes.	HL70357	Varies
900	Receiving system unresponsive	Down: The receiving system is not responsive or is down. Please retransmit the message in 10 minutes.	MIHINERR	E
901	Receiving system down for maintenance	Down: The receiving system is down for planned maintenance. Please consult mihin.org for known system maintenance windows or retransmit the message in 10 minutes.	MIHINERR	Varies
950	General routing error	Routing: A catchall for all other routing errors.	MIHINERR	Varies
951	Destination is unknown	Routing: The destination or receiving system is unknown.	MIHINERR	E
952	Not authorized	Routing: The sending system is not authorized to send to this destination.	MIHINERR	E

NOTE: This is a combination of the HL7 Table 0357 and additional HIE-related (MiHIN) error codes.

5.6.8. BOL Table 0001 - Reason for Study OBR-31

Table 47 - BOL Table 0001 - Reason for Study

Value	Description	Value Set	Comments
RFS01	Diagnosis	BOL_0001	Test ordered to diagnose illness.
RFS02	Outbreak	BOL_0001	Indicate suspect agent responsible for a potential outbreak. Other information may be required when using this option including: Onset date, outbreak identifier, organism suspected, if applicable, MDHHS Prior approval. These additional items are sent as AOE OBXs. See Section 3.1.2.
RFS03	Surveillance	BOL_0001	Indicate which study to which this sample is to be included. The Surveillance Study is sent in an AOE OBX with the code of AOE02. See Section 3.1.2.
The following are used only for chlamydia/gonorrhea/trichomonas Non-Culture Test Requests:			
RFS04	Prenatal Visit	BOL_0001	Patient examination is part of a prenatal visit.
RFS05	Symptoms	BOL_0001	Patient requesting examination due to symptoms, or, symptoms discovered upon examination.
RFS06	History of STD (<3years)	BOL_0001	Patient has been diagnosed with a sexually transmitted disease within the last three years.
RFS07	Age Recommended for Testing	BOL_0001	The Centers for Disease Control (CDC) recommends annual screening of females <= 24 years of age.

Value	Description	Value Set	Comments
RFS08	Retest	BOL_0001	Patients diagnosed with chlamydia and gonorrhea should be retested approximately three months after treatment, regardless of whether they believe that their sex partners were treated. If retesting at three months is not possible, clinicians should retest whenever that person next presents for medical care in the twelve months following initial treatment.
RFS09	Partner Risk	BOL_0001	Patient has multiple sex partners.
RFS10	Infected Partner	BOL_0001	Patient has known exposure to a sexually transmitted disease (STD). This exposure may be self-reported or documented.
RFS11	Test of Cure (GC)	BOL_0001	Sample is being submitted to confirm a patient's gonorrhea infection has been cured.

NOTE: This is a locally defined value set.

APPENDIX A – Use Case – Ambulatory Care Setting

This use case was developed as a collaborative effort between the HHS/ONC Standards and Interoperability Framework Laboratory Orders Initiative, the California Health Care Foundation, and the HL7 Orders and Observations Work Group.

Definitions

This guide defines the following terms from the historic paper-based workflows in relation to the supported use cases for electronic exchange of laboratory order information to the OML message structure as:

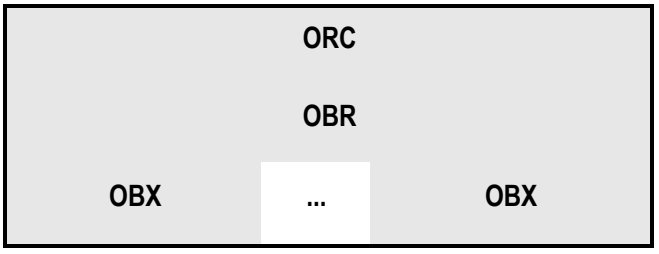
Measurement – a single observation value or calculation recorded using a single Observation Segment (OBX). Note that multiple representations of the same measurement may require multiple observation segments, i.e., quantitative and qualitative statement of the same measurement.

Orderable Test or Laboratory Order – an Observation Request Group (ORC/OBR pair) requesting one or more measurements (Observation Groups (OBXs)).

A single Laboratory Order (ORC)3

Which contains an Orderable Test (OBR)

Which requests one or more Measurements (OBXs)



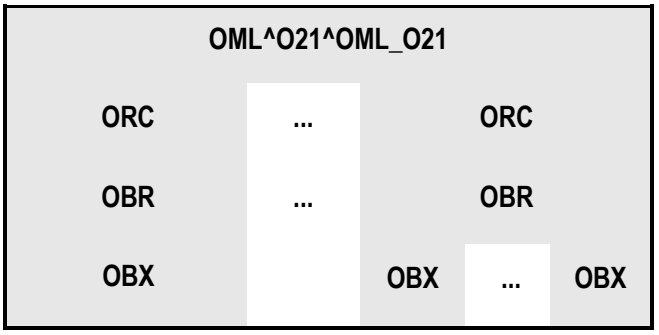
Requisition – One or more Orderable Test(s) transmitted as a new or appended order message (OML^O21^OML_O21).

A requisition (OML)

Contains multiple Laboratory Orders (ORCs)

Which contains an Orderable Test (OBR)

Which requests one or more Measurements (OBXs)



Scope

The scope of this Use Case is the electronic communication of laboratory order information between an EHR-S and a LIS in an ambulatory care setting. This includes new, scheduled, add-on laboratory orders and the cancellation of laboratory orders that were previously placed.

This Use Case has four scenarios:

- Scenario 1: Electronic Ordering of New or Scheduled Laboratory Test(s)
- Scenario 2: Electronic Ordering of Add-On Laboratory Test(s)
- Scenario 3: Requesting the Cancellation of a Previously Placed Laboratory Order
- Scenario 4: Laboratory Cancellation of a Previously Placed Laboratory Order

In Scope

- Electronic ordering of laboratory tests and/or panels in the ambulatory setting for the US Realm.
- Defining the core data elements required for ordering ambulatory laboratory tests and/or panels.
- Laboratory Order Placer (i.e., Ordering Provider) may designate other non-order placers to receive results.
- Harmonization of data elements that are used in both laboratory orders and results.

Out of Scope

- Requesting Status on a Previously Placed Laboratory Order
- Electronic ordering of laboratory tests and/or panels in an acute care setting, internally within a laboratory, referral orders placed between laboratories, and laboratory orders outside the US Realm.
    - Note that the authors of this guide did not validate whether constraints on components should be loosened to support these use cases. This will be addressed in a future version, including definition of minimal incremental profiles to support these use cases. Until such time, implementers are not discouraged from attempting to use this guide for those use cases but should recognize that they may not be able to remain fully conformant. The authors invite comments from implementers on their experience to inform the next version.
- Concepts related to: order queues, clearing houses, or other transport-level mechanisms and protocols that may be used to transfer or hold laboratory orders for later retrieval by a laboratory selected to perform the laboratory service.
- Multi-order status requests (for one patient or multiple patients).
- Specification of the required/supported error condition codes as part of acknowledgement messages.
- Laboratory orders not transmitted electronically.
- Secondary uses of laboratory order data.
- The human mechanisms required to resolve differences between the order identifier and the specimen label.
- Specimen labeling and transport.
- Physical transport level confirmations.
- Interactions between the LIS and EHR System for add-on orders beyond the transmission of the order (to address scenarios such as insufficient specimen or late arrivals of add-on orders).

Actors

There are two actors that have responsibilities related to the conformance profiles defined in this document:

- Laboratory Order Sender – A sender of laboratory order messages that declares conformance to a profile defined in this guide. This actor is referred to as the Order Placer within the V2 message components.
- Laboratory Order Receiver – A receiver of laboratory order messages that declares conformance to a profile defined in this guide. This actor is referred to as the Order Filler within the V2 message components.

Orders for Ambulatory Care Use Case and Context Diagrams

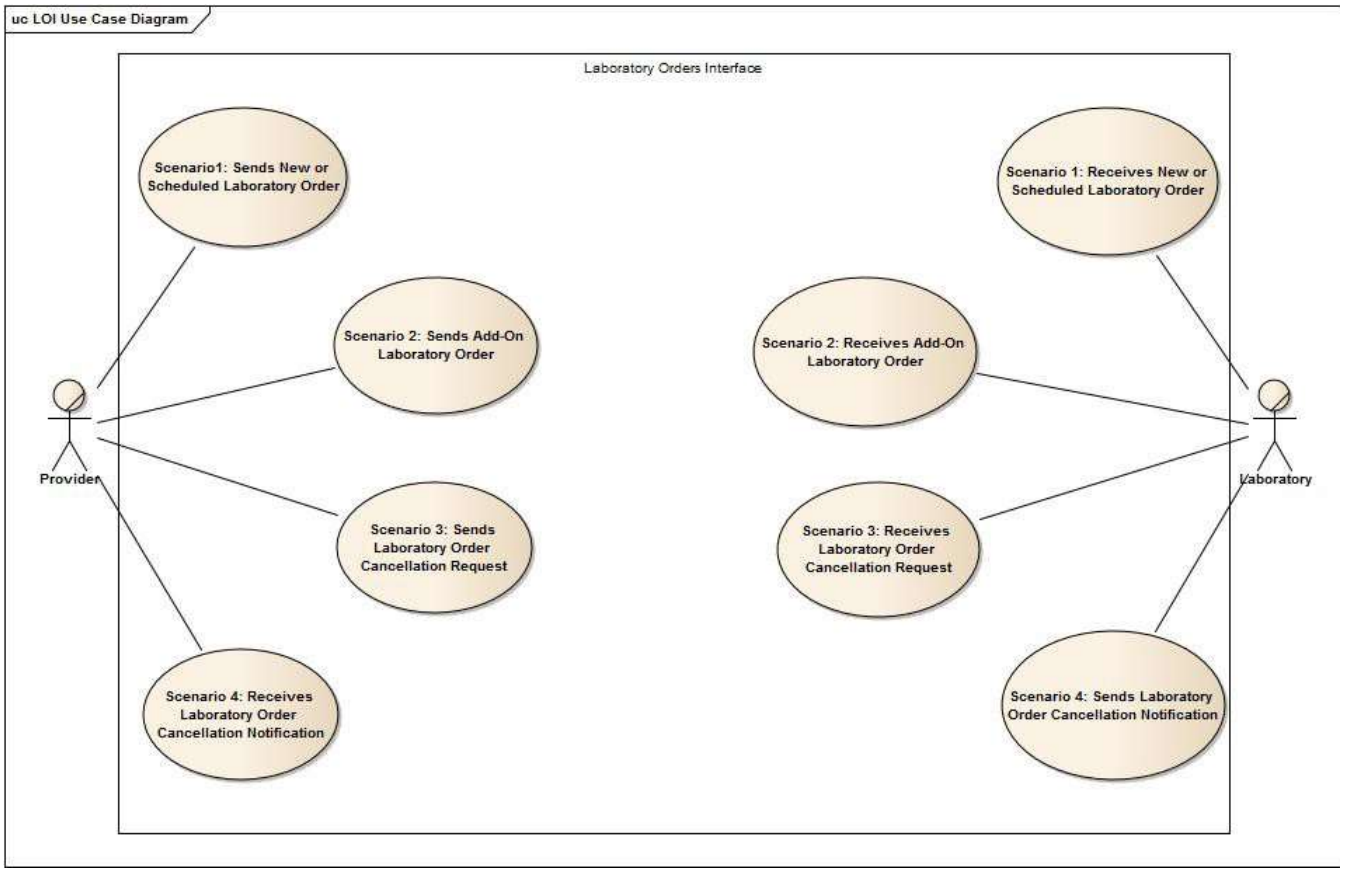


Figure 1 - Use Case Diagram

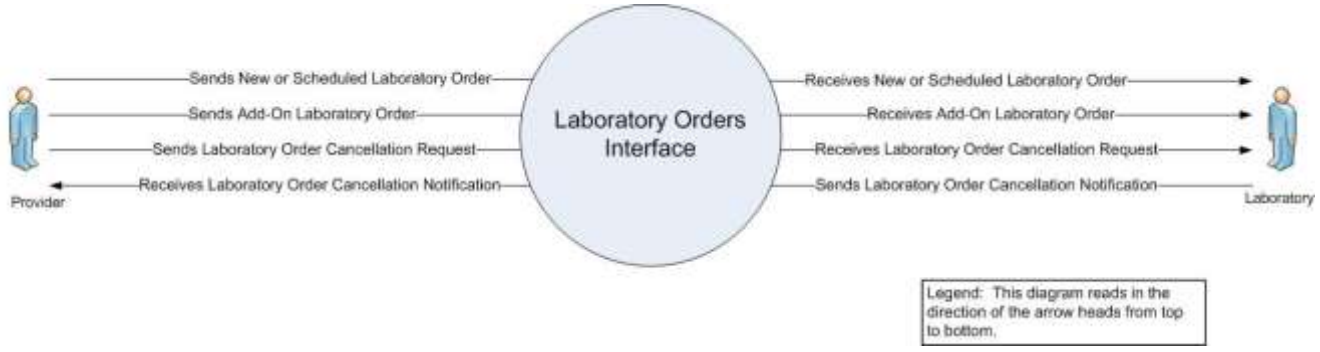


Figure 2 - Context Diagram

User Story

Laboratory orders interfaces automate the electronic communication of test order information between EHR Systems and LIS. To date, there is no consistent implementation guidance available for electronic laboratory order interfaces across the ambulatory setting. Implementation guidance that defines the communication (the message structure, data elements, and vocabularies) of laboratory orders between an EHR System and an LIS, based on accepted industry standards, can:

- Improve care delivery and clinical outcomes through the tight coupling of order and result messages;
- Reduce implementation efforts and costs;
- Reduce on-going support and maintenance-related activities and costs; and

- Provide an extensible foundation for use in other settings such as acute care and public health.

Use Case Assumptions

- Providers *(Order Placers)* securely access clinical information through an EHR system.
- Users have a need to exchange laboratory order data between ambulatory care EHRs and laboratories.
- An EHR system has the ability to manage a laboratory order, including generating the laboratory requisition and sending it to a laboratory.
  - Requisitions are defined by laboratory practice and their exact instantiation is determined by trading partner agreement.
- An EHR system is capable of generating an order electronically and is capable of receiving and processing acknowledgements, results and cancellations.
- A LIS is capable of receiving orders and cancellation requests and generating acknowledgements and cancelation notifications.
- The Laboratory is capable of receiving laboratory orders electronically and in standardized structured format.
- The EHR System and LIS both use data models that include discrete representations of patients, clinician end-users, laboratory requisitions, laboratory orders (which include tests and panels), and laboratory test results (minimally at the level of individual analytics??).
- The Laboratory Results Interface (LRI) Implementation Guide (IG)[6] and the LOI IG will be synchronized with the goal that a laboratory that receives an order conforming to the LOI should be capable of responding with a message conforming to the LRI.
- Appropriate security and transport protocols, patient identification methodology, order identification methodology, patient consent, privacy and security procedures, coding, vocabulary, error handling, and normalization standards have been agreed to by all relevant participants.
- Legal and governance issues regarding data access authorizations, data ownership, and data use are in effect.
- Established network and policy infrastructure exists to enable consistent, appropriate, and accurate information exchange across provider systems, data repositories and locator services. This includes, but is not limited to:
  - Methods to identify and authenticate users;
  - Methods to identify and determine Providers of care;
  - Methods to enforce data access authorization policies;
  - Methods to ensure the veracity of data.
- Detailed audit trails are kept as necessary by all participating systems.
- Security and privacy policies, procedures and practices are commonly implemented to support acceptable levels of patient privacy and security; e.g. HIPAA, HITECH and EHR certification criteria.

Pre-Conditions

Note: The pre- and post-conditions may not apply to all scenarios.

- The Provider *(Order Placer)* has performed all of the necessary checks for medical necessity, insurance eligibility and any needed pre-authorizations.

[6] The IG referenced here is the HL7 Version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface, Release 1 – US Realm, [HL7 Version 2.5.1: ORU^R01], Draft Standard For Trial Use, July 2012 available at www.hl7.org

- After a Provider *(Order Placer)* enters a laboratory order, the EHR system generates an electronic laboratory requisition containing pertinent information as well as appropriate identifiers, such as patient, order, and specimen.
- The Laboratory's test compendium has been entered (manually or via automation) into the EHR system.
- Information for the cancellation requests for laboratory orders has been accurately captured within the EHR System.
- All appropriate billing information is available within the EHR system.
- Specimens are labeled in accordance with established policies and procedures for specimen submission, and can be linked to the order[7].

Post Conditions

- Laboratory orders are successfully transmitted electronically from the Provider's *(Order Placer's)* EHR System to the Laboratory's LIS. The Receiving Laboratory electronically transmits acknowledgement of receipt of the laboratory order. The received order may be placed into an electronic queue for further processing depending on laboratory workflow (although order queues are out of scope for this Use Case).
- Specimen(s) associated with the laboratory order are collected and, if necessary, transported to the laboratory.
- The laboratory processes the laboratory order and associated specimen(s). This step may include retrieval and processing of laboratory orders from a queue or list of received orders. Order queues may be used in the LIS to hold electronic laboratory orders until associated specimens are received, and the appropriate patient matching and registration occur (although order queues are out of scope for this Use Case). After patient matching and registration, the electronic order may be electronically processed in the LIS.
- If the laboratory order and specimen(s) are satisfactory for testing, the laboratory will perform, or attempt to perform, the test(s).
- The laboratory test result is obtained, entered/released in the LIS, and sent to the Provider's *(Order Placer's)* EHR System. This is covered within the Laboratory Results Interface Use Case.
- Successfully transmit laboratory order cancellation request from the Provider's *(Order Placer's)* EHR system to the Laboratory's LIS.
- The Laboratory's LIS has electronically received the laboratory order cancellation request.
- The Laboratory's cancellation of a requisition (one or more orders), or an individual order has been electronically received by the Provider's *(Order Placer's)* EHR System. Note that cancellation of part of an order must be done through a results message as defined in the LRI IG.

Scenario 1 – Electronic Ordering of New or Scheduled Laboratory Test(s)

Using an EHR System, a Provider *(Order Placer)* orders one or more new laboratory tests or scheduled laboratory tests (including future tests) to be performed by a laboratory.

Functional Requirements

[7] CLSI. Specimen Labels: Content and Location, Fonts, and Label Orientation; Approved Standard. CLSI document AUTO12-A. Wayne, PA: Clinical and Laboratory Standards Institute; 2011; ISBN 1-56238-748-0; ISSN 0273-3099, Volume 31 Number 7.

Table 48 - Information Interchange Requirements

Initiating System	Action	Requirement	Action	Receiving System
EHR-S	Send	Laboratory Test Order	Receive	LIS
LIS	Send	Acknowledgement for Received Laboratory Order	Receive	EHR-S

Table 49 - System Requirements

System	System Requirement
EHR-S	Generate an Electronic Laboratory Order with Standardized Structured Data
LIS	Process Electronic Laboratory Order
LIS	Generate and Send Laboratory Order Acknowledgement
EHR-S	Process Laboratory Order Acknowledgement

Sequence Diagram

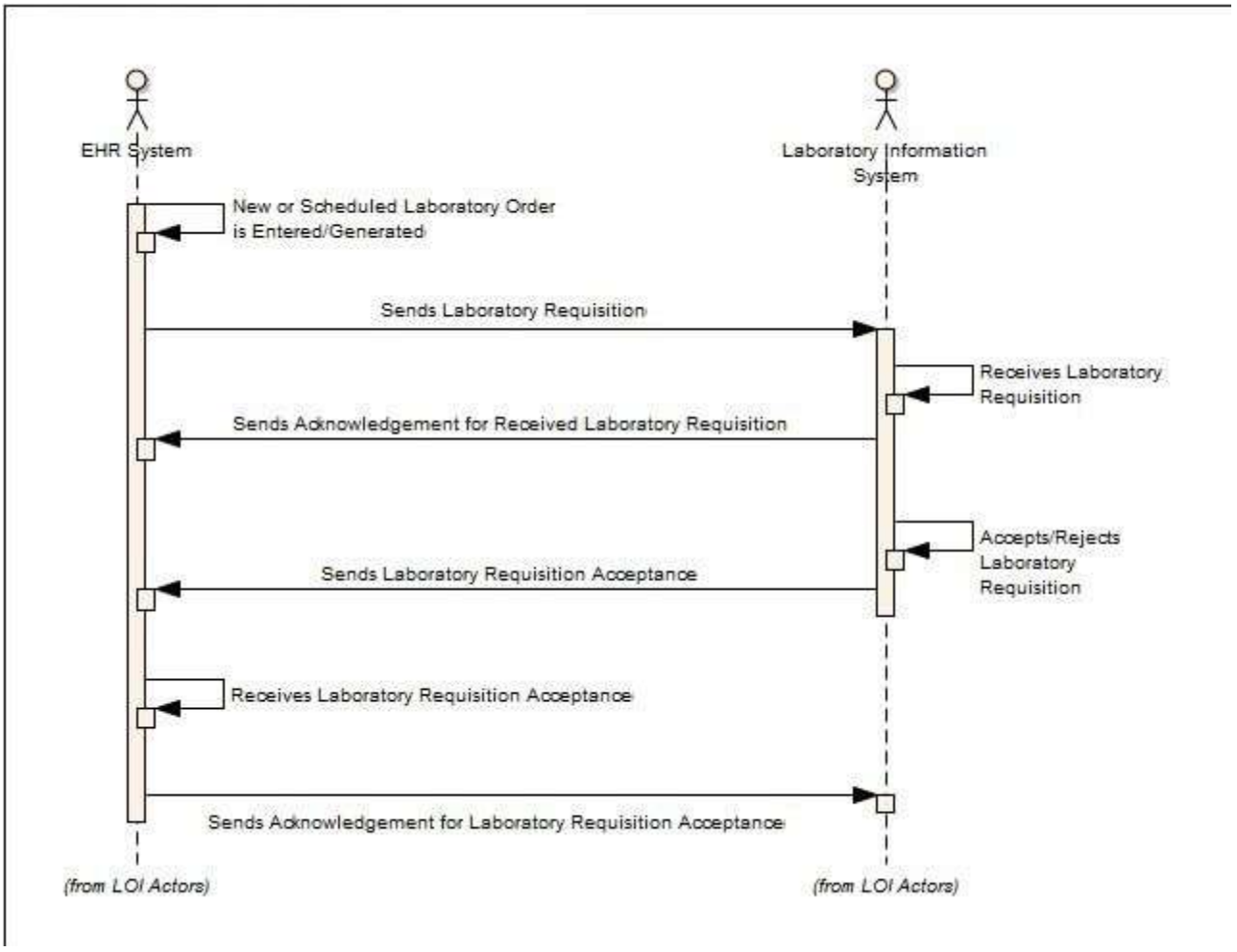


Figure 3 - Scenario 1 Sequence Diagram

Table 50 - Scenario 1 – Electronic Ordering of New or Scheduled Laboratory Test(s)[8]

SEQ	System(s)	Transaction	Requirements
1	EHR-S	New or Scheduled Laboratory Order is entered/generated	

[8] Note that in this and subsequent tables describing the scenarios with specific requirements for MSH-15 and MSH-16 the

SEQ	System(s)	Transaction	Requirements
2	EHR-S to LIS	Sends Laboratory Requisition	OML^O21^OML_O21: ORC-1 is valued 'NW', ORC-2/OBR-2 is valued, ORC-3/OBR-3 is empty, MSH-15 is valued '(AL)', MSH-16 is valued '(AL)'. Not allowed: both MSH-15 valued 'NE' and MSH-16 valued 'NE' in the same message.
3	LIS	Receives Laboratory Requisition	
4	LIS to IE/EHR-S	Sends Acknowledgement for Received Laboratory Requisition	ACK^O21^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.
5	LIS to EHR-S	Sends Laboratory Requisition Acceptance	ORL^O22^ORL_O22: ORC-1 is valued 'OK' or 'UA', ORC-2/OBR-2 is valued with the placer order number (echoed), ORC-3/OBR-3 is valued with the filler order number, MSH-15 is valued '(AL)', MSH-16 is valued 'NE'.
6	EHR-S/IE to LIS	Sends Acknowledgement for Laboratory Requisition Acceptance	ACK^O22^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.

Note: Step 4 can only be supported if MSH-16 is not 'NE', rather 'AL' or 'SU' is to be used, or 'ER', which would yield 'UA'.

Scenario 2 – Electronic Ordering of Add-On Laboratory Test(s)

Using an EHR System, a Provider *(Order Placer)* adds one or more additional tests to a previously transmitted test requisition. Any changes to the order including adding a test must be done prior to sending the specimen to the lab. After sending the specimen contact the lab, see section 3.1.1

Note that if there is no need to relate the additional order to the specimen associated with a prior order, the regular new order must be followed.

At the time the provider requests an order to be added, this may occur when the specimen is already drawn or still needs to be drawn. The provider may not know which situation is in place.

Therefore, this guide suggests that until there is more clarity on how the provider's ordering system is updated with specimen collection information, the provider's add-on order request is communicated as a regular order and may use, if known:

- The placer order number, when using non-unique order numbers, of the original order; and/or
- The placer group number that was used when the original order was placed; and/or
- The specimen data of the specimen the order is intended to be added to.

Using the first two methods make it appear, other than the transaction date/time, as if the order was placed together and consistent with the original order.

The third method clearly associates the new order with the same specimen that was already collected for a prior order. Note that depending on the state of the order fulfillment, the Laboratory may not be able to perform the requested test against the intended specimen as it may be too late for a number of reasons (e.g., insufficient

format "MSH-15 is valued '(NN)'" or "MSH-15 is valued 'NN'" is used. The use of the parentheses, e.g., '(NN)', indicates that at least the value NN from Table 0155 is supported, while 'NN' with no parentheses indicates that only the value NN is allowed in this scenario.

specimen, specimen too old).

Scenario 3 – Requesting the Cancellation of a Previously Placed Laboratory Order

The Provider (*Order Placer)* determines that one or more orders from a previously transmitted electronic laboratory requisition needs to be cancelled and requests via the EHR that the Laboratory cancel the performance of the laboratory order(s), see section 3.1.1

Since the Provider does not know how far the Laboratory has progressed with the performance of the test, or may not even have received the specimen, the Provider must use the LOI Cancel Request message in Section 2.2 OML^O21^OML_O21: Laboratory Order Message – Cancel Order.

The Laboratory determines whether the test can be cancelled, or whether the order has progressed too far to cancel. The Laboratory is strongly encouraged to use the LOI Cancel Notification indicating "Cancelled as Requested", or "Unable to Cancel" as described in Section 2.2. However, this guide recognizes that some Laboratories may still use the LRI Result message using the result status as described in the LRI Implementation Guide.

Once the Provider receives any preliminary or final results, the test cannot be cancelled anymore and the Provider shall not use the LOI Cancel Request message anymore.

Functional Requirements

Table 51 - Information Interchange Requirements

Initiating System	Action	Requirement	Action	Receiving System
EHR-S	Send	Laboratory Order Cancellation Request	Receive	LIS
LIS	Send	Acknowledgement of Laboratory Order Cancellation Request	Receive	EHR-S
LIS	Send	Notification of Laboratory Order Cancellation	Receive	EHR-S
EHR-S	Send	Acknowledgement of Laboratory Order Cancellation Notification	Receive	LIS

Table 52 - System Requirements

System	System Requirement
EHR	Generate Laboratory Order Cancellation Request
LIS	Process Order Cancellation Request

Sequence Diagram

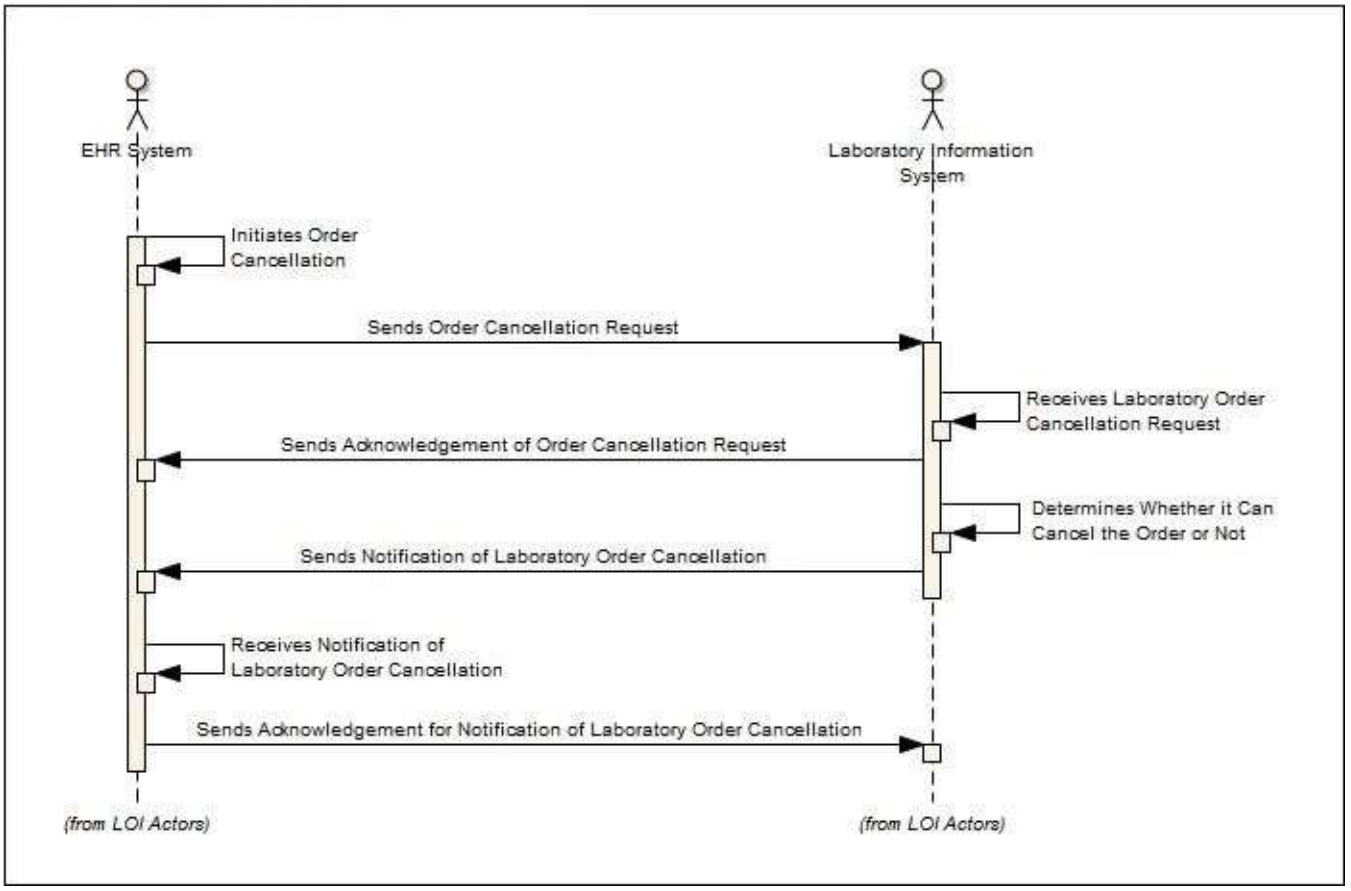


Figure 4 - Scenario 3 Sequence Diagram

Table 53 - Scenario 3 – Requesting the Cancellation of a Previously Placed Laboratory Order

SEQ	System(s)	Transaction	Requirements
1	EHR-S	Initiates Order Cancellation	
2	EHR-S to LIS	Sends Cancellation Request	OML^O21^OML_O21: ORC-2/OBR-2 is valued, ORC- 3/OBR-3 is valued if known, ORC-1 is valued 'CA', MSH-15 is valued '(AL)', MSH-16 is valued '(AL)' Not allowed: MSH-15 valued 'NE', MSH-16 valued 'NE'.
3	LIS	Receives Laboratory Order Cancellation Request	
4	LIS to IE/EHR-S	Sends Acknowledgement of Cancellation Request	ACK^O21^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.
5	LIS	Determines whether it can cancel the order or not	
6	LIS to EHR-S	Sends Notification of Laboratory Order Cancellation	ORL^O22^ORL_O22: ORC-1 is valued 'CR' or 'UC', ORC-2/OBR-2 is valued with the placer order number, ORC-3/OBR-3 is valued with the filler order number, MSH-15 is valued '(AL)', MSH-16 is valued '(NE)'.
7	EHR-S	Receives Notification of Laboratory Order Cancellation	

SEQ	System(s)	Transaction	Requirements
8	IE/EHR-S to LIS	Sends Acknowledgement for Notification of Laboratory Order Cancellation	ACK^O22^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.

Scenario 4 – Laboratory Cancellation of a Previously Placed Laboratory Order

The Laboratory *(Order Filler)* may cancel laboratory orders and send a cancellation notification message to the Provider *(Order Placer)* because it is unable to perform the laboratory order, independent of the Provider requesting cancellation. This applies to an original/initial order or an add-on order.

Laboratories can cancel a test request received by the LIS (or queue for this purpose) any time before the test report (preliminary or final) is transmitted to the provider(s).

It is strongly recommended the Laboratory use the LOI Cancel Order up to the point that the specimen starts to be processed.

After that, the Laboratory could either use the LOI Cancel Order message described in Section 2.2, or use the LRI Result Cancel Notification depending on how far it progressed with the test before it determined to cancel.

Functional Requirements

Table 54 - Information Interchange Requirements

Initiating System	Action	Requirement	Action	Receiving System
LIS	Send	Cancellation Notification	Receive	EHR-S
EHR-S	Send	Acknowledgment (this should include information on the receipt of the transmission)	Receive	LIS

Table 55 - System Requirements

System	System Requirement
LIS	Generate Laboratory Order Cancellation Notification
EHR	Receive Cancellation Notification
EHR	Process Cancellation Notification

Sequence Diagram

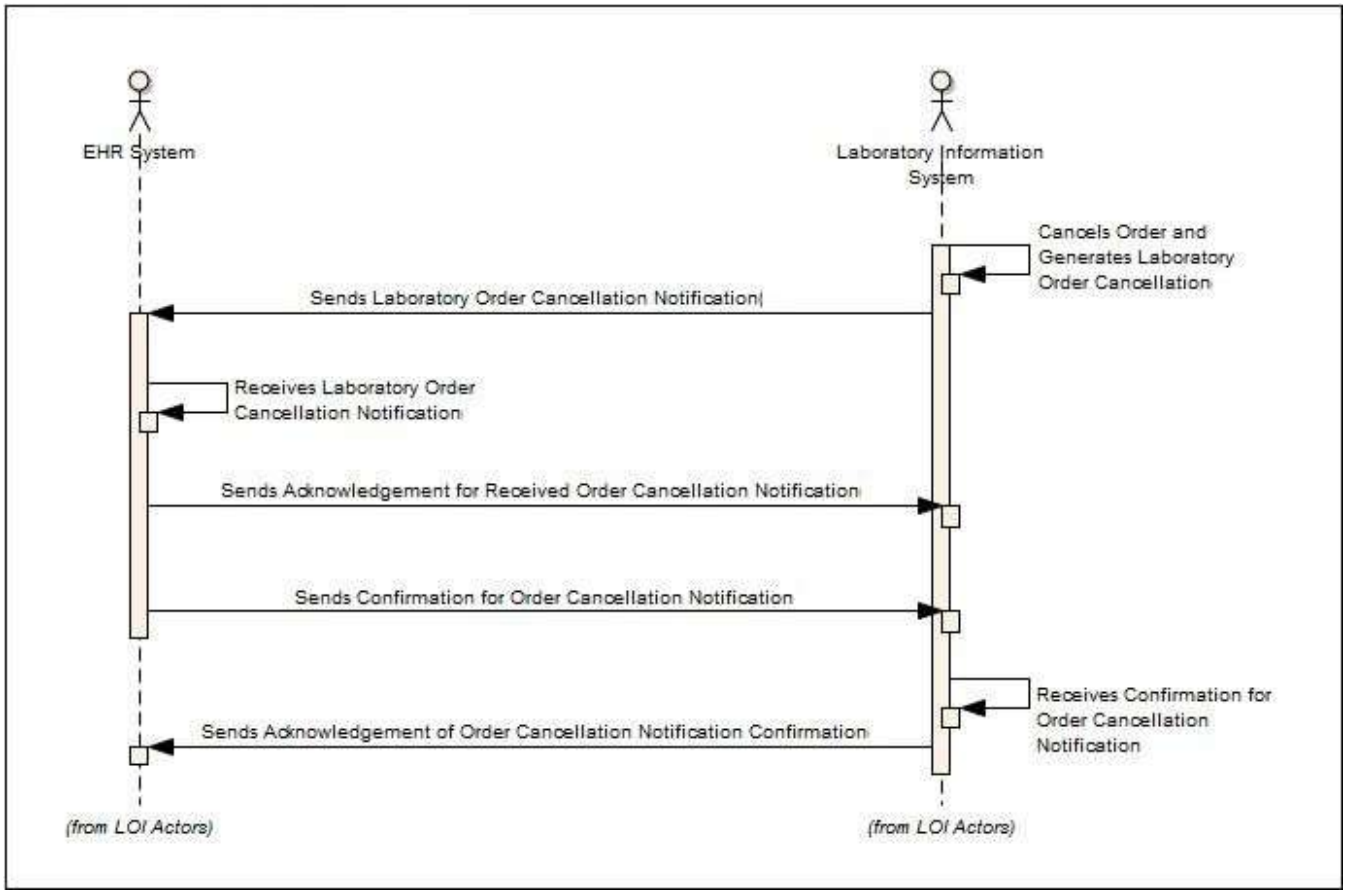


Figure 5 - Scenario 4 Sequence Diagram

Table 56 - Scenario 4 – Laboratory Cancellation of a Previously Placed Laboratory Order

SEQ	System(s)	Transaction	Requirements
1	LIS	Cancels order and generates Laboratory Order Cancellation	
2	LIS to EHR-S	Sends Laboratory Order Cancellation Notification	OML^O21^OML_O21: ORC-1 is valued 'OC', ORC-2/OBR-2 is valued with the placer order number, ORC-3/OBR-3 is valued with the filler order number, MSH-15 is valued '(AL)', MSH-16 is valued '(AL)'.
3	EHR-S	Receives Laboratory Order Cancellation Notification	
4	EHR-S/IE to LIS	Sends Acknowledgement for Received Cancellation Notification	ACK^O21^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.
5	EHR-S to LIS	Sends confirmation for Order Cancel Notification	ORL^O22^ORL_O22: ORC-1 is valued 'NR', MSH-15 is valued '(AL)', MSH-16 is valued 'NE'.
6	LIS to IE/EHR-S	Sends Acknowledgement of Order Cancellation Notification Confirmation	ACK^O22^ACK: MSH-15 is valued 'NE', MSH-16 is valued 'NE'.

Key Technical Decisions

One of the primary features of this implementation guide is its focus on key points of broad interoperability. The HL7 implementation guides in Section 1.2.1 Requisite Knowledge informed the content of this specification as analysis

indicated that none of the candidate guides could satisfy the use case requirements without some adjustment. This guide is the result of combining the best practices from the current body of work while making further adjustment to meet the needs of ambulatory ordering, and preparing for increased consistency of laboratory orders across care settings.

Profile and Component Architecture

This guide extensively uses constrainable profiles to define a minimum set of requirements to enable the successful exchange of laboratory orders. The main objective is to ensure that EHR systems and Laboratory systems can exchange laboratory orders with minimum, if any, modifications from one combination to another combination of software, while maintaining flexibility to enable software developers to provide more capabilities using the same core message definitions. Section 1 Introduction describes the mandatory and optional profiles to be used, as well as the rules on further constraining the guide.

Use of ISO Object Identifier (OID)

OIDs, or Object Identifiers, provide a strong identifier that uniquely identifies the object in question and is global in scope. Examples of information that OIDs can identify are items about patients, orders, providers and organizations. This means the identifier includes enough information to remain unique when taken out of the context within which the identifier was created. The ISO OID specification (ISO/IEC 8824:1990(E)) is the globally accepted technology for this purpose, and is recommended as the means to satisfy the requirement for a universally unique identifier.

This guide defines a Globally Unique Component (LOI_GU_Component) that prescribes the use of an ISO Object Identifier (OID) for a specific set of fields.

The GU/NG profile definition discusses use of OIDs for identifiers' assigning authority only. Other identifiers could use OIDs as well for the assigning authority. Note that OIDs are not intended to be used to identify a coding system as referenced in CWE-03/CWE-06 and further enumerated in Table 43 - HL7 TABLE 0396 – Coding Systems Code.

HL7 has developed an implementation guide for the use of OIDs, “HL7 Implementation Guidance for Unique Object Identifiers (OIDs), Release 1”[9], which provides guidance on how organizations can use and manage OIDs.

Use of Vocabulary Standards

This guide calls for specific vocabulary standards for the exchange of laboratory information such as LOINC and SNOMED. Standard vocabularies, particularly coded laboratory tests and their results, enable automated decision support for patient healthcare, as well as for public health surveillance of populations. Terminology is updated periodically, and it is best practice to use the most current version of the coding system.

Field Length and Truncation

This guide is silent as to the field length definition conventions, lengths, and truncation rules, and directs the reader to HL7 Version 2.7.1, Chapter 2 Control for informative guidance.

Scope of Implementation

The base standard indicates that receiving applications “…shall process (save/print/archive/etc.)…”. For order-

[9] The current version of the HL7 Implementation Guidance for Unique Object Identifiers (OIDs), Release 1 is available from HL7 (www.hl7.org). Members may obtain a copy without charge in the Members-only area of the site, others may purchase a copy for a nominal fee via the HL7 Store

specific segments, e.g., ORC, OBR, SPM; this typically means saving that data. For other segments, i.e., MSH, the receiving application may not always have to save the data, as the segment is focused on ensuring the order-specific data arrives in the appropriate place, and therefore may have shorter-term value.

Due to receiving system variations and need, this guide does not specifically indicate for each field whether to store it or not. This is left to the individual system's scope and purpose.

Ask At Order Entry (AOE) Observations

Ask at Order Entry (AOE) responses are recorded as observations that provide critical information for the calculation or interpretation of some lab results, or to satisfy state and federal health agency mandated information gathering requirements, i.e., for blood lead testing. Not every order will have the need for AOE questions and associated observations. The lab will indicate if and which AOEs to include with the order in their test compendium.

Examples of the type of information gathered from a patient include employment information, pregnancy status, the date of the last menstrual period, mother's age, and questions about family and personal history. In some cases there may be AOEs that request the outcome of previous results phrased as a question, e.g., "Was your previous pap abnormal?"

AOE responses can take several formats, including but not limited to:

- Yes/No (and coded) to answer questions like "Is this your first pregnancy?"
- A code drawn from a value set to provide a coded response to, i.e., "What ethnicity do you consider yourself to be?"
- A number with units for the mother's age;
- A date format for the patient's last menstrual period.

The OBX segments under the ORC/OBR pair must be used in the order messages to convey these Ask at Order Entry questions.

Although not strictly asked at order entry, other supporting clinical information about the patient collected during specimen collection, i.e., fasting status of the patient, are considered AOE observations for purposes of this guide, and must be communicated using the OBX segment under the ORC/OBR segments as well.

LOINC shall be used as the standard coding system for AOE questions if an appropriate and valid LOINC code exists. The LOINC and local code describing the question will be placed in OBX-3 (Observation Identifier). Appropriate and valid status is defined in the LOINC Manual Section 11.2 Classification of LOINC Term Status. If a local coding system is in use, both the LOINC and the local code should also be sent to help with identification of coding issues. When no valid LOINC exists, the local code may be the only code sent.

Special Considerations

Note that various Ask at Order Entry questions may appear to have specific fields in PID, NK1, or other segments. When a clinically relevant value is asked through an Ask at Order Entry question, it must be conveyed through the OBX segments as described above, as these values are used for clinical interpretations rather than through a seemingly similar field in PID, NK1, or other segment. The following provide specific examples and guidance whether to use an existing field or the OBX segment. This list is not meant to be exhaustive.

- Date of Birth - Always use PID-7 (Date/Time of Birth) and should never be asked as an AOE, as there is

only one at any point in time.

- Race - PID-10 (Race) is provided for demographic (administrative/billing), not clinical use. The lab must provide an AOE for those tests where Race drives the interpretation of results. The value must be determined by the Ordering Provider and must be sent as an AOE OBX. Note that state and/or national regulations may dictate other behaviors.
- Ethnicity – PID-22 (Ethnic Group) is provided for demographic (administrative/billing), not clinical use. The lab must provide an AOE where Ethnicity drives the interpretation of results. The value must be determined by the Ordering Provider and must be sent as an AOE OBX. Note that state and/or national regulations may dictate other behaviors.

Note: More specific PID-10 (Race) and PID-22 (Ethnicity) values are available, but not limited to, those found in the CDCREC document (http://www.cdc.gov/nchs/data/dvs/Race_Ethnicity_CodeSet.pdf).

Examples

Example AOE using OBX for blood lead test in adults; the highlighted 1 and 2 indicate how to use OBX-4 (Observation Sub-ID) to link the Name to an Address when more than one employer is communicated.

Employer Name – Organization

```
OBX|1|XON|63741-3^For whom did you work at your main job or
business?^LN^123^Employer^99Lab|1|Good Health
Hospital^L^4544^3^M10^CMS^XX^^A|||||||||201210310800|
```

Employer Address

```
OBX|2|XAD|63758-7^What was the location of this company?^LN
^345^EmpAdd^99lab|1|1000 Hospital Lane^Suite 123^Ann Arbor
^MI^99999^USA^B^^WA|||||||||201210310800|
```

Employer Name – Person

```
OBX|4|XPN|63741-3^For whom did you work at your main job or
business?^LN^123^Employer^99lab|2|
Everyman^Adam^A^III^DR^^L^^^^^^^PHD|||||||||201210310800|
```

Employer Address

```
OBX|5|XAD|63758-7^What was the location of this company?^LN
^345^EmpAdd^99lab|2|65 South Street^^Ann Arbor
^MI^99999^USA^B^^WA|||||||||201210310800|
```

Communication of Other Clinical Information OR Prior Results

Should the need arise to send results not obtained at the time of order entry or specimen collection and/or those requiring full results report structure such as culture/sensitivity reports, the Prior Results segment group in the message structure should be used.

Referenced Profiles – Antecedents

This specification documents a message profile for Laboratory Orders Interface (LOI) profile for Senders and Receivers based on the HL7 version 2.5.1[10]. Other laboratory ordering profiles were referenced and used as source materials in the development of this guide, including:

- EHR-Laboratory Interoperability and Connectivity Specification for Orders, ELINCS Orders, v1.0 June 28, 2011.

This document should not be considered the source of truth for any statement or assertion in regards to the referenced profiles. They are provided here as antecedent documentation, and are not required for successful implementation of this guide.

Conformance to this Guide

This implementation guide defines components that are combined into profiles to define specific conformance requirements.

The components must be combined to create a valid profile for a particular transaction by populating MSH-21 (Message Profile Identifier) with the profile identifiers. Multiple profiles or component profiles can be present in MSH.21 provided the combination of profiles does not conflict with each other. Additional definitions and guidance for MSH-21 can be found in Section 2.5.1 MSH – Message Header Segment.

[10] The referenced documents are all available from HL7 (www.hl7.org) – Members may obtain a copy without charge in the Members-only area of the site, others may purchase a copy for a nominal fee via the HL7 Store.

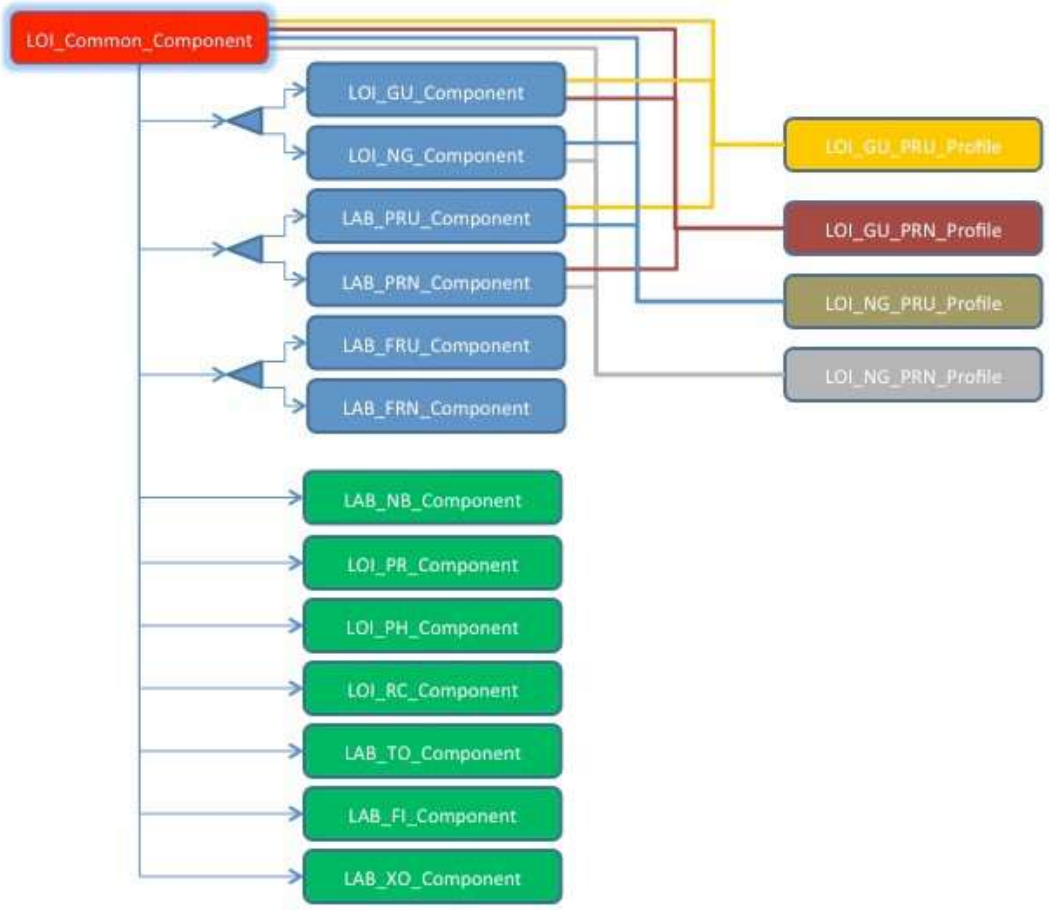


Figure 6 - Profile and Component Architecture

As of this version, a valid order profile consists of a minimum of three components when the order placer sends messages to a laboratory, and four components when the laboratory responds to an existing order:

1. The LOI_Common_Component (2.8.1.1)
2. The LOI_GU_Component (Globally Unique) OR the LOI_NG_Component (Non-Globally Unique) (2.8.1.2, 2.8.1.3)
3. The LAB_PRU_Component (Unique Placer Order Number) OR the LAB_PRN_Component (Non-Unique Placer Order Number) (2.8.1.4, 2.8.1.8)
4. The LAB_FRU_Component (Unique Filler Order Number) OR the LAB_FRN_Component (Non-Unique Filler Order Number) (2.8.1.5, 2.8.1.6)

The LOI_GU and LOI_NG components declare that the message conforms (or not) to the use of ISO Object Identifiers (OIDS) to establish global uniqueness for identifier.

The LAB_PRU and the LAB_PRN components declare if the placer order number is globally unique (or not).

The LAB_FRU and the LAB_FRN components declare if the filler order number is globally unique (or not).

Additional components are optional but may be included when supported by both trading partners. This guide defines seven such components:

1. LAB_FI_Component (Financial Information) (2.8.1.4)
2. LAB_NB_Component (Newborn) (2.8.1.9)
3. LAB_TO_Component (Time Offset) (2.8.1.10)
4. LAB_XO_Component (Exclusions) (2.8.1.11)
5. LOI_PH_Component (Public Health) (2.8.1.12)
6. LOI_PR_Component (Prior Results) (2.8.1.13)
7. LOI_RC_Component (Results Copies) (2.8.1.14)

As of this version a valid response profile consists of a minimum of two components:

1. The LOI_Acknowledgement_Component (2.8.3.1)
2. The LOI_GU_Acknowledgement_Component (2.8.3.2) OR the
3. LOI_NG_Acknowledgement_Component (2.8.3.3)

Order Profile Components

Note that the TO, XO, NB, PH, PR and RC components are not included in the pre-coordinated profiles; rather they are included when applicable, i.e., the LAB_NB_Component would be included to support the level of precision a Newborn use case requires on time-related data elements if the tests are related to newborn screening. A receiver shall reject the message with optional profiles if not addressed by partner agreements.

In addition to trading partner agreement on the use of optional profiles, trading partners need to agree on the required profile, either NG or GU.

The components that can be assembled into profiles are:

LOI_Common_Component – ID: 2.16.840.1.113883.9.66

This component indicates that the message adheres to the rules set out in this implementation guide.

Note: This component sets the minimum constraints on the base specification for all profiles defined by this guide and may be further constrained by additional components.

LOI_GU_Component (Globally Unique) – ID: 2.16.840.1.113883.9.78

This component indicates that the following fields use Globally Unique Identifiers according to Section “Use of ISO Object Identifier (OID)” for at least the assigning authority within the data type used.

- MSH-3 – Sending Application
- MSH-4 – Sending Facility
- MSH-5 – Receiving Application
- MSH-6 – Receiving Facility
- PID-3 – Patient Identifier List
- ORC-2 – Placer Order Number
- ORC-3 – Filler Order Number
- ORC-4 – Placer Group Number
- ORC-12 – Ordering Provider
- ORC-21 – Ordering Facility Name
- OBR-2 – Placer Order Number
- OBR-3 – Filler Order Number

- OBR-16 – Ordering Provider
- OBR-28 – Result Copies To
- OBR-29 – Parent
- OBX-16 – Responsible Observer
- OBX-23 – Performing Organization Name
- OBX-25 – Performing Organization Medical Director
- SPM-2 – Specimen ID
- NK1-13 – Organization Name - NK13
- IN1-3 – Insurance Company ID
- IN1-4 – Insurance Company Name
- IN1-11 – Insured's Group Emp Name
- GT1-21 – Guarantor Organization Name
- PRT-1 – Participation Instance ID
- PRT-5 – Participation Person

These fields must use the GU version of their data type definition.

LOI_NG_Component (Non-Globally Unique) – ID: 2.16.840.1.113883.9.79

This component indicates that the identification method has been negotiated between the trading partners where none or some may use ISO OIDs according to Section "Use of ISO Object Identifier (OID)" while others use any of the identification methods allowed through the base standard. Consequently, these identifiers are not guaranteed to be globally unique.

- MSH-3 – Sending Application
- MSH-4 – Sending Facility
- MSH-5 – Receiving Application
- MSH-6 – Receiving Facility
- PID-3 – Patient Identifier List
- ORC-2 – Placer Order Number
- ORC-3 – Filler Order Number
- ORC-4 – Placer Group Number
- ORC-12 – Ordering Provider
- ORC-21 – Ordering Facility Name
- OBR-2 – Placer Order Number
- OBR-3 – Filler Order Number
- OBR-16 – Ordering Provider
- OBR-28 – Result Copies To
- OBR-29 – Parent
- SPM-2 – Specimen ID
- NK1-13 – Organization Name - NK13
- IN1-3 – Insurance Company ID
- IN1-4 – Insurance Company Name
- IN1-11 – Insured's Group Emp Name
- GT1-21 – Guarantor Organization Name

- PRT-1 – Participation Instance ID
- PRT-5 – Participation Person

These fields must use the NG version of their data type definition.

LAB_FI_Component – ID: 2.16.840.1.113883.9.80

This optional component indicates that the following segment groups and segments are specifically relevant to financial processes such as billing that may be communicated through other means than the lab order or results messages, e.g., ADT or other financial transactions.

- Visit group
- Insurance group
- GT1 segment.

LAB_FRU_Component (Unique Filler Number) – ID: 2.16.840.1.113883.9.83

This component indicates that the filler order number uniquely identifies the test ordered. No additional information is necessary, such as the universal service identifier, since the identifier on its own is unique. This component can only be declared in MSH-21 by the filler and subsequently copied if the copier (e.g., placer upon responding, or another party forwarding the message) did not change the filler order number value.

LAB_FRN_Component (Non-Unique Filler Number) – ID: 2.16.840.1.113883.9.84

This component indicates that the test ordered shall be identified using the universal identifier in conjunction with the filler order number. The filler order number must be combined with the universal service identifier to uniquely identify the test ordered. No additional information is necessary, such as the universal service identifier, since the identifier on its own is unique. This component can only be declared in MSH-21 by the filler and subsequently copied if the copier (e.g., placer upon responding, or another party forwarding the message) did not change the filler order number value.

LAB_PRU_Component (Unique Placer Order Number) – ID: 2.16.840.1.113883.9.82

This component indicates that the placer order number uniquely identifies the test ordered. No additional information is necessary, such as the universal service identifier, since the identifier on its own is unique. This component can only be declared in MSH-21 by the placer and subsequently copied if the copier (e.g., filler upon responding, or another party forwarding the message) did not change the placer order number value.

LAB_PRN_Component (Non-Unique Placer Order Number) – ID: 2.16.840.1.113883.9.81

This component indicates that the test ordered shall be identified using the universal identifier in conjunction with the placer order number. The placer order number must be combined with the universal service identifier to uniquely identify the test ordered. No additional information is necessary, such as the universal service identifier, since the identifier on its own is unique. This component can only be declared in MSH-21 by the placer and subsequently copied if the copier (e.g., filler upon responding, or another party forwarding the message) did not change the placer order number value.

LAB_NB_Component (Newborn) – ID: 2.16.840.1.113883.9.24

This component indicates that the data type TS_3 is used in PID-7 (Date/Time of Birth) to support Newborn Screening.

LAB_TO_Component (Time Offset) – ID: 2.16.840.1.113883.9.22

This component indicates the time zone component of the TS/TM data type used for the following fields is required. Note that the base standard's default use of MSH-7 (Date/Time of Message) time zone offset dictates that if the time zone offset is present in MSH-7 it becomes the default time zone for the message instance and applies to all other date/time fields in that same message instance where a time zone offset is not valued. This profile requires that all date/time fields indicated below carry a time zone offset when populated.

Note that this is a domain component and the following fields may or may not be required in this IG:

- PID-7 – Date/Time of Birth
- IN1-18 - Insured's Date Of Birth
- OBR-7 – Observation Date/Time
- OBR-8 – Observation End Date/Time
- OBR-22 – Results Rpt/Status Chng – Date/Time
- TQ1-7 – Start Date/Time
- TQ1-8 – End Date/Time
- OBX-5 – Observation Value (when OBX-2 is 'TM' or 'TS')
- OBX-14 – Date/Time of the Observation
- OBX-19 – Date/Time of the Analysis
- SPM-17 – Specimen Collection Date/Time

It is important that the sending application has appropriately resolved the time zone offsets for PID-7, TQ1-7, TQ1-8, OBR-7, OBR-8, and SPM-17 as these date/times are managed through ADT/Registration and Orders interfaces.

LAB_XO_Component (Exclusions) – ID: 2.16.840.1.113883.9.23

One of the basic premises of this guide is to enable senders to compose transactions that may satisfy multiple purposes, i.e., multiple implementation guides that share the same required fields and vocabulary. They therefore may populate any of the fields/components marked O (optional). At the same time, this implementation guide wants to expressly reinforce that if data is sent in optional fields/segments, the receiver can completely ignore those. Therefore, the usage code X is used sparingly, while the usage code O is mostly used when the field/component is not necessary for the use case at hand. The rationale is that according to the definition of "X" per the base standard is "For conformant sending applications, the element shall not be sent. Conformant receiving applications may ignore the element if it is sent, or may raise an application error."

However to accommodate those implementations where the population of any optional fields remaining is not desirable, the LAB_XO_Component is defined to indicate that all of the remaining optional segments and fields that are marked O (Optional) are now considered to be marked with an X (Not Supported). Its use yields, in combination with the other profile components, a fully implementable profile in accordance with Chapter 2B. Note though that this component is strictly voluntary, and cannot be mandated by either trading partner to be used to enable a successful results transaction.

LOI_PH_Component (Public Health) – ID: 2.16.840.1.113883.9.94

When a laboratory result is sent to public health, additional data is required. The PH component facilitates the inclusion of information necessary for public health reporting in the larger test order and result process between ordering providers/laboratories and performing laboratories to ensure that the data is available to be sent to PH

when necessary. This profile is used to identify those fields that are to be considered for Public Health according to condition predicates and conformance statements referencing this profile component. The fields that are effectively added and/or modified by this profile are:

- PID-6 – Mother's Maiden Name
- PID-13 – Phone Number – Home
- PID-14 – Phone Number – Business
- NK1-30 – Contact Person's Name
- NK1-32 – Contact Person's Address
- ORC-21 – Ordering Facility Name
- ORC-22 – Ordering Facility Address
- ORC-23 – Ordering Facility Phone Number
- SPM-5 – Specimen Type Modifier
- SPM-6 – Specimen Additives
- SPM-7 – Specimen Collection Method
- SPM-8 – Specimen Source Site
- SPM-9 – Specimen Source Site Modifier
- SPM-10 – Specimen Collection Site

LOI_PR_Component (Prior Results) – ID: 2.16.840.1.113883.9.95

Inclusion of this optional profile component in MSH-21 (Message Profile Identifier) indicates that prior results are included in the message using the Prior Results segment group. Results that were obtained before this order was placed are considered prior results. When the original structure needs to be preserved, i.e., microbiology results, the Prior Results segment group would enable the transmission of a fully structured result set.

Prior results shall be encoded so as to conform to the LRI IG.

LOI_RC_Component (Results Copies) – ID: 2.16.840.1.113883.9.96

Inclusion of this profile component in MSH-21 (Message Profile Identifier) indicates that the number of recipients of copies of the results can be greater than five.

Order Profiles (Pre-Coordinated Components)

One may either enumerate the component IDs in MSH-21 (Message Profile Identifier) in no particular order or use one of the profile IDs provided for each of the valid combinations:

LOI_GU_PRU_Profile – ID: 2.16.840.1.113883.9.85

This profile pre-coordinates the use of the LOI_Common_Component, LOI_GU_Component, and the LAB_PRU_Component.

LOI_GU_PRN_Profile – ID: 2.16.840.1.113883.9.86

This profile pre-coordinates the use of the LOI_Common_Component, LOI_GU_Component, and the LAB_PRN_Component.

LOI_NG_PRU_Profile – ID: 2.16.840.1.113883.9.87

This profile pre-coordinates the use of the LOI_Common_Component, LOI_NG_Component, and the LAB_PRU_Component.

LOI_NG_PRN_Profile – ID: 2.16.840.1.113883.9.88

This profile pre-coordinates the use of the LOI_Common_Component, LOI_NG_Component, and the LAB_PRN_Component.

Response Components

The following profile components are used in either the accept acknowledgement or the application acknowledgement messages.

LOI_Acknowledgement_Component – ID: 2.16.840.1.113883.9.89

This component indicates that the acknowledgement message adheres to the rules set out in this implementation guide.

Note: This component sets the minimum constraints on the base specification for the acknowledgement, and may be further constrained by additional components.

LOI_GU_Acknowledgement_Component – ID: 2.16.840.1.113883.9.90

This profile ID is used to identify an ACK that is constrained for the profiles defined within this guide in response to the OML message, where MSH-21 (Message Profile Identifier) contains '2.16.840.1.113883.9.85' (LOI_GU_PRU_Profile), **OR** '2.16.840.1.113883.9.86' (LOI_GU_PRN_Profile), **OR** '2.16.840.1.113883.9.78' (LOI_GU_Component).

LOI_NG_Acknowledgement_ Component – ID: 2.16.840.1.113883.9.91

This profile ID is used to identify an ACK that is constrained for the profiles defined within this guide in response to the OML message, where MSH-21 (Message Profile Identifier) contains '2.16.840.1.113883.9.87' (LOI_NG_PRU_Profile), **OR** '2.16.840.1.113883.9.88' (LOI_NG_PRN_Profile), **OR** '2.16.840.1.113883.9.79' (LOI_NG_Component).

Response Profiles (Pre-Coordinated Components)

One may either enumerate the component IDs in MSH-21 (Message Profile Identifier) in no particular order or use one of the profile IDs provided for each of the valid combinations:

LOI_GU_RESPONSE_PROFILE – ID: 2.16.840.1.113883.9.92

This profile pre-coordinates the use of the LOI_Acknowledgement_Component and the LOI_GU_Acknowledgement_Component.

LOI_NG_RESPONSE_PROFILE – ID: 2.16.840.1.113883.9.93

This profile pre-coordinates the use of the LOI_Acknowledgement_Component and the LOI_NG_Acknowledgement_Component.

Extended Profile Use

The sender may create other components or profiles that are defined outside of this implementation guide for use in conjunction with the profiles and components defined in this guide. However, those profiles and components are strictly voluntary and shall be properly constrained against the base standard and the profiles and components defined in this IG. Neither the sender nor the receiver shall require the use of any additional profiles and components in combination with the profiles/components defined in this guide to achieve a successful send or receive of Lab Orders.

Relationship to Results

This implementation guide imposes constraints on data elements where the origination of the content for those data elements is a lab order. For all such data elements, the expectation is that the result message will support those elements as defined in the guide, with the expectation that the lab will provide either the original value from the order, or the best value the lab is aware of in the result message at the time the result message is generated.

This guide is intended to be compatible with the HL7 Version 2.5.1 IG: Laboratory Results Interface for US Realm, Release 1, July 2012.

APPENDIX B - Data Types

Data types are further defined in this implementation guide for all fields that have a usage of R, RE, C(a/b). Data types used only for optional fields are not included. Please refer to the base standard for those data types.

Depending on the components used, the usage of data type components for some data types varies. To clearly indicate when to use specific data type components, each data type that has a varying definition based on profile will be documented with multiple variations, e.g., CX_GU vs. CX_NG. Composite data types indicate which variety of the component's data type is applicable, while the data type of a field is marked as "varies" where the comment indicates the data type choices based on the declared profile or component.

CE – Coded Element

Table 57 - Coded Element (CE)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	R		
2	Text	ST	RE		It is strongly recommended that text be sent to accompany any identifier.
3	Name of Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CE.1 (Identifier) is valued.
4	Alternate Identifier	ST	RE		The alternate identifier (from the alternate coding system) should be the closest match for the identifier found in component 1.
5	Alternate Text	ST	RE		It is strongly recommended that alternate text be sent to accompany any alternate identifier.
6	Name of Alternate Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CE.4 (Alternate Identifier) is valued.

CNE – Coded With No Exceptions

Table 58 - CNE – Coded With No Exceptions

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	R		
2	Text	ST	R		
3	Name of Coding System	ID	R	HL70396	
4	Alternate Identifier		O		
5	Alternate Text		O		
6	Name of Alternate Coding System		O		
7	Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CNE.3 (Name Of Coding System) is valued.
8	Alternate Coding System Version ID		O		
9	Original Text		O		

CWE – Coded with Exceptions

CWE – Coded With Exceptions – Base

Note: Components 10-22 are pre-adopted from V2.7.1 CWE.

Table 59 - CWE – Coded With Exceptions – Base

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	C(R/O)		Condition Predicate: if CWE.2 is not valued.
2	Text	ST	C(R/RE)		Condition Predicate: if CWE.1 is not valued.
3	Name of Coding System	ID	C(R/X)	HL70396	Condition Predicate: if CWE.1 is valued.
4	Alternate Identifier		O		
5	Alternate Text		O		
6	Name of Alternate Coding System		O		
7	Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE.3 (Name Of Coding System) is valued.
8	Alternate Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE.6 (Name Of Alternate Coding System) is valued.
9	Original Text		O		
10	Second Alternate Identifier		O		
11	Second Alternate Text		O		
12	Second Name of Alternate Coding System		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		
22	Second Alternate Value Set Version ID		O		

Usage Note

The CWE data type is used where it is necessary to communicate a code, text, or coding system, and the version of the coding system the code was drawn from and alternate codes drawn from another coding system. Many coded fields in this specification identify coding systems or value set attributes that must be used for the field. When populating the CWE data types with these values, this guide does not give preference to the triplet in which the standard code should appear.

CWE_CR – Coded With Exceptions – Code Required

Note: Components 10-22 are pre-adopted from V2.7.1 CWE.

Table 60 - CWE_CR – Coded With Exceptions – Code Required

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	R		
2	Text	ST	RE		It is strongly recommended that text be sent to accompany any identifier.
3	Name of Coding System	ID	R	HL70396	

SEQ	Component Name	DT	Usage	Value Set	Comments
4	Alternate Identifier	ST	RE		The alternate identifier (from the alternate coding system) should be the closest match for the identifier found in CWE_CR.1 (Identifier).
5	Alternate Text	ST	RE		It is strongly recommended that alternate text be sent to accompany any alternate identifier.
6	Name of Alternate Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CR.4 (Alternate Identifier) is valued.
7	Coding System Version ID	ST	RE		
8	Alternate Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CR.6 (Name Of Alternate Coding System) is valued.
9	Original Text	ST	RE		Original Text is used to convey the text that was the basis for coding.
10	Second Alternate Identifier		O		
11	Second Alternate Text		O		
12	Second Name of Alternate Coding System		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		
22	Second Alternate Value Set Version ID		O		

Usage Note

The CWE_CR data type is used where it is necessary to communicate a code, text, or coding system, and the version of the coding system the code was drawn from and alternate codes drawn from another coding system. Many coded fields in this specification identify coding systems or value set attributes that must be used for the field. When populating the CWE_CR data types with these values, this guide does not give preference to the triplet in which the standard code should appear. The receiver is expected to examine the coding system names in components CWE_CR-3 (Name of Coding System) and, if valued, CWE_CR-6 (Alternate Name of Coding System) and, if valued, CWE_CR-20 (Second Alternate Name of Coding System) to determine if it recognizes the coding system or value set.

CWE_CR1 – Coded With Exceptions – Code Required – Second Triplet Optional

Note: Components 10-22 are pre-adopted from V2.7.1 CWE.

Table 61 - CWE_CR1 – Coded With Exceptions – Code Required – Second Triplet Optional

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	R		

SEQ	Component Name	DT	Usage	Value Set	Comments
2	Text	ST	RE		It is strongly recommended that text be sent to accompany any identifier.
3	Name of Coding System	ID	R	HL70396	
4	Alternate Identifier		O		
5	Alternate Text		O		
6	Name of Alternate Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CR1.4 (Alternate Identifier) is valued.
7	Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CR1.3 (Name Of Coding System) is valued.
8	Alternate Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CR1.6 (Name Of Alternate Coding System) is valued.
9	Original Text	ST	RE		Original Text is used to convey the text that was the basis for coding.
10	Second Alternate Identifier		O		
11	Second Alternate Text		O		
12	Second Name of Alternate Coding System		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		
22	Second Alternate Value Set Version ID		O		

Usage Note

The CWE_CR1 data type is used where it is necessary to communicate a code, text, or coding system and the version of the coding system the code was drawn from and alternate codes drawn from another coding system. Many coded fields in this specification identify coding systems or value set attributes that must be used for the field. When populating the CWE_CR1 data types with these values, this guide does not give preference to the triplet in which the standard code should appear.

The receiver is expected to examine the coding system names in components CWE_CR1-3 (Name of Coding System) and, if valued, CWE_CR1-6 (Alternate Name of Coding System) and, if valued, CWE_CR1-20 (Second Alternate Name of Coding System) to determine if it recognizes the coding system or value set.

CWE_CRE – Coded With Exceptions – Code Required, But May Be Empty

Note: Components 10-22 are pre-adopted from V2.7.1 CWE.

Table 62 - CWE_CRE – Coded With Exceptions – Code Required, But May Be Empty

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	RE		
2	Text	ST	C(RE/X)		Condition Predicate: If CWE_CRE.1 (Identifier) is valued. It is strongly recommended that text be sent to accompany any identifier. When a coded value is not known, the original text element (CWE_CRE.9) is used to carry the text, not the text (CWE_CRE.2) element.
3	Name of Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CRE.1 (Identifier) is valued.
4	Alternate Identifier	ST	C(RE/X)		Condition Predicate: If CWE_CRE.1 (Identifier) is valued. The alternate identifier (from the alternate coding system) should be the closest match for the identifier found in CWE_CRE.1 (Identifier).
5	Alternate Text	ST	C(RE/X)		Condition Predicate: If CWE_CRE.4 (Alternate Identifier) is valued. It is strongly recommended that alternate text be sent to accompany any alternate identifier.
6	Name of Alternate Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CRE.4 (Alternate Identifier) is valued.
7	Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CRE.3 (Name Of Coding System) is valued.
8	Alternate Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CRE.6 (Name Of Alternate Coding System) is valued.
9	Original Text	ST	C(R/RE)		Condition Predicate: If CWE_CRE.1 (Identifier) and CWE.4_CRE (Alternate Identifier) are not valued. Original Text is used to convey the text that was the basis for coding. If neither the first or second triplet has values, this contains the text of the field.
10	Second Alternate Identifier		O		
11	Second Alternate Text		O		
12	Second Name of Alternate Coding System		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		

SEQ	Component Name	DT	Usage	Value Set	Comments
22	Second Alternate Value Set Version ID		O		

Usage Note

The CWE_CRE data type is used where it is necessary to communicate a code, text, or coding system, and the version of the coding system the code was drawn from and alternate codes drawn from another coding system. Many coded fields in this specification identify coding systems or value set attributes that must be used for the field. When populating the CWE_CRE data types with these values, this guide does not give preference to the triplet in which the standard code should appear.

The receiver is expected to examine the coding system names in components CWE_CRE-3 (Name of Coding System) and, if valued, CWE_CRE-6 (Alternate Name of Coding System) and, if valued, CWE_CRE-20 (Second Alternate Name of Coding System) to determine if it recognizes the coding system or value set.

CWE_CRE1 – Coded With Exceptions – Code Required, But May Be Empty – Second Triplet Optional

NOTE: Components 10-22 are pre-adopted from V2.7.1 CWE.

Table 63 - CWE_CRE1 – Coded With Exceptions – Code Required, But May Be Empty – Second Triplet Optional

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Identifier	ST	RE		
2	Text	ST	C(RE/X)		Condition Predicate: If CWE_CRE1.1 (Identifier) is valued. It is strongly recommended that text be sent to accompany any identifier. When a coded value is not known, CWE_CRE1.9 (Original Text Element) is used to carry the text, not CWE_CRE1.2 (Text) element.
3	Name of Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CRE1.1 (Identifier) is valued.
4	Alternate Identifier		O		
5	Alternate Text	ST	C(RE/X)		Condition Predicate: If CWE_CRE1.4 (Alternate Identifier) is valued. It is strongly recommended that alternate text be sent to accompany any alternate identifier.
6	Name of Alternate Coding System	ID	C(R/X)	HL70396	Condition Predicate: If CWE_CRE1.4 (Alternate Identifier) is valued.
7	Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CRE1.3 (Name Of Coding System) is valued.
8	Alternate Coding System Version ID	ST	C(RE/X)		Condition Predicate: If CWE_CRE1.6 (Name Of Alternate Coding System) is valued.
9	Original Text	ST	C(R/RE)		Condition Predicate: If CWE_CRE1.1 (Identifier) and CWE_CRE1.4 (Alternate Identifier) are not valued. Original Text is used to convey the text that was the basis for coding. If neither the first or second triplet has values, this contains the text of the field.
10	Second Alternate Identifier		O		

SEQ	Component Name	DT	Usage	Value Set	Comments
11	Second Alternate Text		O		
12	Second Name of Alternate Coding system		O		
13	Second Alternate Coding System Version ID		O		
14	Coding System OID		O		
15	Value Set OID		O		
16	Value Set Version ID		O		
17	Alternate Coding System OID		O		
18	Alternate Value Set OID		O		
19	Alternate Value Set Version ID		O		
20	Second Alternate Coding System OID		O		
21	Second Alternate Value Set OID		O		
22	Second Alternate Value Set Version ID		O		

Usage Note

The CWE_CRE1 data type is used where it is necessary to communicate a code, text, or coding system, and the version of the coding system the code was drawn from and alternate codes drawn from another coding system. Many coded fields in this specification identify coding systems or value set attributes that must be used for the field. When populating the CWE_CRE1 data types with these values, this guide does not give preference to the triplet in which the standard code should appear. The receiver is expected to examine the coding system names in components CWE_CRE1-3 (Name of Coding System) and, if valued, CWE_CRE1-6 (Alternate Name of Coding System) and, if valued, CWE_CRE1-20 (Second Alternate Name of Coding System) to determine if it recognizes the coding system or value set.

CX – Extended Composite ID with Check Digit

CX_GU – Extended Composite ID with Check Digit (Globally Unique)

Table 64 - CX_GU – Extended Composite ID with Check Digit (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	ID Number	ST	R		
2	Check Digit		O		
3	Check Digit Scheme		O		
4	Assigning Authority	HD_GU	R		The Assigning Authority component is used to identify the system, application, organization, etc. that assigned the value in CX_GU-1 (ID Number).
5	Identifier Type Code	ID	R	HL70203 (V2.7.1)	
6	Assigning Facility		O		
7	Effective Date		O		
8	Expiration Date		O		
9	Assigning Jurisdiction		O		
10	Assigning Agency or Department		O		

Usage Note

The CX_GU data type is used to carry identifiers. The GU profile requires that assigning authorities accompany all identifiers, and that all identifiers carry an identifier type. This method allows the exchange of universally unique identifiers for the associated object across organizational and enterprise boundaries, enabling broad interoperability.

Although the Identifier Type Code component is required in this implementation guide, it is not a part of the actual identifier. Rather, it is metadata about the identifier. The ID Number and Assigning Authority component, together, constitute the actual identifier. The Assigning Authority represents the identifier's name space, e.g., Healthy Hospital Medical Record Numbers, or Healthy Hospital Order Numbers. Consequently, the Identifier Type Code is technically not necessary. However, due to various naming practices, organizational mergers, and other challenges, it is not always clear through the Assigning Authority OID what identifier type is being indicated by the identifier name space (note that it is highly recommended that this detail be associated with the OID in the registry metadata about the OID). Therefore, to maintain forward compatibility with V3, while recognizing the current practical challenges with understanding the identifier type/namespace at hand, this guide opted to keep the Identifier Type Code component as required.

CX_NG – Extended Composite ID with Check Digit (Non-Globally Unique)

Table 65 - CX_NG – Extended Composite ID with Check Digit (Non-Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	ID Number	ST	R		
2	Check Digit	ST	O		
3	Check Digit Scheme		O		
4	Assigning Authority	HD_NG	RE		
5	Identifier Type Code	ID	R	HL70203 (V2.7.1)	
6	Assigning Facility		O		
7	Effective Date		O		
8	Expiration Date		O		
9	Assigning Jurisdiction		O		
10	Assigning Agency or Department		O		

Usage Note

The CX_NG data type is used to carry identifiers. This guide requires that assigning authorities accompany all identifiers if known, and that all identifiers carry an identifier type. This method allows the exchange of unique identifiers for the associated object across organizational and enterprise boundaries, enabling broad interoperability.

Although the Identifier Type Code component is required in this implementation guide, it is not a part of the actual identifier. Rather, it is metadata about the identifier. The ID Number and Assigning Authority component, together, constitute the actual identifier. The Assigning Authority represents the identifier's name space, e.g., Healthy Hospital Medical Record Numbers, or Healthy Hospital Order Numbers. Consequently, the Identifier Type Code is technically not necessary. However, due to various naming practices, organizational mergers, and other challenges, it is not always clear through the Assigning Authority OID what identifier type is being indicated by the identifier name space (note that it is highly recommended that this detail be associated with the OID in the registry metadata about the OID). Therefore, to maintain forward compatibility with V3, while recognizing the current practical challenges with understanding the identifier type/namespace at hand, this guide opted to keep the Identifier Type Code component as required.

DR_1 – Date/Time Range 1

Table 66 - DR_1 – Date/Time Range 1

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Range Start Date/Time	TS_5	R		
2	Range End Date/Time	TS_5	RE		

EI – Entity Identifier

EI_GU – Entity Identifier (Globally Unique)

Table 67 - EI_GU – Entity Identifier (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Entity Identifier	ST	R		
2	Namespace ID	IS	RE		
3	Universal ID	ST	R		
4	Universal ID Type	ID	R		Fixed to 'ISO'.

Usage Note

The EI_GU data type is used to carry identifiers. This GU profile requires that all entity identifiers be accompanied by assigning authorities. This allows the exchange of unique identifiers for the associated object across organizational and enterprise boundaries, enabling broad interoperability.

In the EI data type, the Namespace ID, Universal ID and Universal ID types, correspond to the HD data type identified elsewhere. These types, together, are commonly considered the assigning authority for the identifier.

Conformance Statements: LOI_GU_Component

LOI-1: EI_GU.3 (Universal ID) **SHALL** be valued with an ISO-compliant OID.

LOI-2: EI_GU.4 (Universal ID Type) **SHALL** contain the value 'ISO'.

EI_NG – Entity Identifier (Non-Globally Unique)

Table 68 - EI_NG – Entity Identifier (Non-Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Entity Identifier	ST	R		
2	Namespace ID	IS	C(R/O)		Condition Predicate: If EI_NG.3 (Universal ID) is not valued.
3	Universal ID	ST	C(R/O)		Condition Predicate: If EI_NG.2 (Namespace ID) is not valued.
4	Universal ID Type	ID	C(R/X)	HL70301 (V2.7.1)	Condition Predicate: If EI_NG.3 (Universal ID) is valued.

Usage Note

The EI_NG data type accommodates identifiers that are not globally unique and therefore may not have the assigning authority (components 3-4) populated. Local arrangements determine how uniqueness is established.

EIP – Entity Identifier Pair

EIP_GU – Entity Identifier Pair (Globally Unique)

Table 69 - EIP_GU – Entity Identifier Pair (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Placer Assigned Identifier	EI_GU	RE		

SEQ	Component Name	DT	Usage	Value Set	Comments
2	Filler Assigned Identifier	EI_GU	C(R/RE)		Condition Predicate: If EIP_GU.1 (Placer Assigned Identifier) is not valued.

EIP_NG – Entity Identifier Pair (Non-Globally Unique)

Table 70 - EIP_NG – Entity Identifier Pair (Non-Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Placer Assigned Identifier	EI_NG	RE		
2	Filler Assigned Identifier	EI_NG	C(R/RE)		Condition Predicate: if EIP_NG.1 (Placer Assigned Identifier) is not valued.

HD – Hierarchic Designator

HD_GU – Hierarchic Designator (Globally Unique)

Table 71 - HD_GU – Hierarchic Designator (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Namespace ID	IS	RE		This value reflects a local code that represents the combination of HD_GU.2 (Universal ID) and HD_GU.3 (Universal ID Type).
2	Universal ID	ST	R		
3	Universal ID Type	ID	R		Fixed to 'ISO'.

Usage Note

The actual value of and use of HD_GU.1 (Namespace ID) and HD_GU.2 (Universal ID) must be negotiated between trading partners for each of the fields where this data type is used.

The HD_GU data type is used directly to identify objects such as applications or facilities. It is used also as a component of other data types, where it is typically an assigning authority for an identifier. Where this capability is used in this specification, the usage is described separately. Note that the HD_GU data type has been constrained to carry an ISO Compliant OID identifying an application, a facility, or an assigning authority.

Conformance Statements: LOI_GU_Component

LOI-3: HD_GU.2 (Universal ID) **SHALL** be valued with an ISO-compliant OID.

LOI-4: HD_GU.3 (Universal ID Type) **SHALL** contain the value 'ISO'.

HD_NG – Hierarchic Designator (Non-Globally Unique)

Table 72 - HD_NG – Hierarchic Designator (Non-Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Namespace ID	IS	C(R/O)		Condition Predicate: If HD_NG.2 (Universal ID) is not valued.
2	Universal ID	ST	C(R/O)		Condition Predicate: If HD_NG.1 (Namespace ID) is not valued.
3	Universal ID Type	ID	C(R/X)	HL70301 (V2.7.1)	Condition Predicate: If HD_NG.2 (Universal ID) is valued.

Usage Note

The actual value of and use of components must be negotiated between trading partners for each of the fields where this data type is used.

The HD_NG-2 (Universal ID) does not have to be an ISO compliant OID, as is the case for the HD_GU data type flavor,

it is permissible to use a human readable text string, i.e., full name of the hospital, or other value that both trading partners agree to.

The HD_NG data type is used directly to identify objects such as applications or facilities. It is used also as a component of other data types, where it is typically an assigning authority for an identifier. Where this capability is used in this specification, the usage is described separately.

JCC – Job Code/Class

Table 73 - JCC – Job Code/Class

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Job Code		O		
2	Job Class		O		
3	Job Description Text	TX	R		

MSG – Message Type

Table 74 - MSG – Message Type

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Message Code	ID	R	HL70076 (constrained)	
2	Trigger Event	ID	R		Constrained to 'O21' from HL7 Table 0003 Event Type Code
3	Message Structure	ID	R	HL70354 (constrained)	

Conformance Statement – LOI_Common_Component

LOI-5: MSG-2 (Trigger Event) **SHALL** be valued with 'O21',

PT – Processing Type

Table 75 - PT – Processing Type

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Processing ID	ID	R	HL70103	
2	Processing Mode		O		

SAD – Street Address

Table 76 - SAD – Street Address

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Street or Mailing Address	ST	R		
2	Street Name		O		
3	Dwelling Number		O		

SN – Structured Numeric

Table 77 - SN – Structured Numeric

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Comparator	ST	RE		
2	Num1	NM	R		
3	Separator/Suffix	ST	C(RE/O)		Condition Predicate: If SN.2 (Num1) and SN.4 (Num2) are valued.
4	Num2	NM	RE		

Usage Note

The SN data type carries a structured numeric result value. Structured numeric values include intervals (^0^-^1), ratios (^1^/^2 or ^1^:^2), inequalities (<^10), or categorical results (^2^+)

TS – Time Stamp

It is strongly recommended that the time zone offset always be included in the DTM, particularly if the granularity includes hours, minutes, seconds, etc. Specific fields in this implementation guide may require Date/Time to a specific level of granularity, which may require the time zone offset. The granularity of the DTM as well as whether the time zone offset is required as defined in the Time Stamp patterns TS_0 through TS_5, below.

TS_0 – Time Stamp 0

Table 78 - TS_0 – Time Stamp 0

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.
The DTM component of this Time Stamp has the following constraints:					
	YYYY	DTM	R		
	MM		O		
	DD		O		
	HH		O		
	MM		O		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ	DTM	Varies		LAB_TO_Component Usage: 'RE' All other profiles Usage: 'O'

TS_1 – Time Stamp 1

Table 79 - TS_1 – Time Stamp 1

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.
The DTM component of this Time Stamp has the following constraints:					
	YYYY	DTM	R		
	MM	DTM	R		
	DD	DTM	R		
	HH	DTM	R		
	MM	DTM	R		
	SS	DTM	R		
	[.S[S[S[S]]]]		O		
	+/- ZZZZ	DTM	Varies		LAB_TO_Component Usage: 'R' All other profiles Usage: 'O'

TS_2 – Time Stamp 2

Table 80 - TS_2 – Time Stamp 2

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.
The DTM component of this Time Stamp has the following constraints:					

SEQ	Component Name	DT	Usage	Value Set	Comments
	YYYY	DTM	R		
	MM	DTM	RE		
	DD	DTM	RE		
	HH		O		
	MM		O		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ	DTM	Varies		LAB_TO_Component Usage: 'RE' All other profiles Usage: 'O'

TS_3 – Time Stamp 3

Table 81 - TS_3 – Time Stamp 3

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.
The DTM component of this Time Stamp has the following constraints:					
	YYYY	DTM	R		
	MM	DTM	RE		
	DD	DTM	RE		
	HH	DTM	RE		
	MM	DTM	RE		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ	DTM	C(RE/O)		LAB_TO_Component Usage: 'RE' All other profiles Usage: 'O'

TS_4 – Time Stamp 4

Table 82 - TS_4 – Time Stamp 4

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.
The DTM component of this Time Stamp has the following constraints:					
	YYYY	DTM	R		
	MM	DTM	C(R/X)		Condition Predicate: If TS_4.1 (YYYY) is not valued '0000'.
	DD	DTM	C(R/X)		Condition Predicate: If TS_4.1 (YYYY) is not valued '0000'.
	HH	DTM	C(RE/X)		Condition Predicate: If TS_4.1 (YYYY) is not valued '0000'.
	MM	DTM	C(RE/X)		Condition Predicate: If TS_4.1 (YYYY) is not valued '0000'.
	[SS[.S[S[S[S]]]]]		C(O/X)		Condition Predicate: If TS_4.1 (YYYY) is not valued '0000'.
	+/- ZZZZ	DTM	Varies		LAB_TO_Component Usage: 'RE' All other profiles Usage: 'O'

Usage Note

When the date is not known, then value YYYY with '0000' and leave everything else empty.

TS_5 – Time Stamp 5

Table 83 - TS_5 – Time Stamp 5

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Time	DTM	R		
2	Degree of Precision		X		Excluded for this Implementation Guide.

SEQ	Component Name	DT	Usage	Value Set	Comments
The DTM component of this Time Stamp has the following constraints:					
	YYYY	DTM	R		
	MM	DTM	R		
	DD	DTM	R		
	HH	DTM	RE		
	MM	DTM	RE		
	[SS[.S[S[S[S]]]]]		O		
	+/- ZZZZ	DTM	Varies		LAB_TO_Component Usage: 'RE' All other profiles Usage: 'O'

VID – Version Identifier

Table 84 - VID – Version Identifier

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Version ID	ID	R		Constrained to '2.5.1' from HL7 0104 Version ID
2	Internationalization Code		O		
3	International Version ID		O		

Conformance Statement – LOI_Common_Component

LOI-6: VID.1 (Version Identifier) **SHALL** be valued with '2.5.1'.

XAD – Extended Address

NOTE: If all XAD components are blank while the field using XAD is required, Senders and Receivers need to resolve what components should be valued and how, or agree to another process.

Table 85 - XAD – Extended Address

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Street Address	SAD	RE		
2	Other Designation	ST	RE		
3	City	ST	RE		
4	State or Province	ST	RE	USPS Alpha State Codes	
5	Zip or Postal Code	ST	RE		.
6	Country Code	ID	RE	HL70399	Use 3-character (alphabetic) form of ISO 3166 for HL7 Table 0399 as defined in HL7 Chapter 2, Section 2.15.9.17.
7	Address Type	ID	RE	HL70190	
8	Other Geographic Designation		O		
9	County/Parish Code		O		
10	Census Tract		O		
11	Address Representation Code		O		
12	Address Validity Range		X		Excluded for this Implementation Guide.
13	Effective Date		O		

SEQ	Component Name	DT	Usage	Value Set	Comments
14	Expiration Date		O		

XCN – Extended Composite ID Number and Name for Persons

Table 86 - XCN_GU – Extended Composite ID Number and Name for Persons (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	ID Number	ST	R		The ID Number component combined with XCN_GU.9 (Assigning Authority) must uniquely identify the associated person. Note: despite the component being named "ID Number" this component is an ST string data type, not numeric, so the component is not limited to just numbers.
2	Family Name	FN	R		Condition Predicate: If XCN_GU.1 (ID Number) is not valued.
3	Given Name	ST	RE		I.e., first name.
4	Second and Further Given Names or Initials Thereof		O		
5	Suffix (e.g., JR or III)		O		
6	Prefix (e.g., DR)		O		
7	Degree (e.g., MD)		X		Excluded for this Implementation Guide.
8	Source Table		C(O/O)		NOTE: This component is (C) in the v2.5.1 standard with no condition predicate defined; none is defined in this IG.
9	Assigning Authority	HD_GU	R		Condition Predicate: If XCN_GU.1 (ID Number) is valued. The Assigning Authority component is used to identify the system, application, organization, etc. that assigned the ID Number in component 1.
10	Name Type Code	ID	RE	HL70200	
11	Identifier Check Digit		O		
12	Check Digit Scheme		C(O/X)		Condition Predicate: If XCN_GU.11 is valued.
13	Identifier Type Code	ID	C(R/X)	HL70203 (V2.7.1)	Condition Predicate: If XCN_GU.1 (ID Number) is valued.
14	Assigning Facility		O		
15	Name Representation Code		O		
16	Name Context		O		
17	Name Validity Range		X		Excluded for this Implementation Guide.
18	Name Assembly Order		O		
19	Effective Date		O		
20	Expiration Date		O		
21	Professional Suffix		O		
22	Assigning Jurisdiction		O		
23	Assigning Agency or Department		O		

XON – Extended Composite Name and Identification Number for Organizations

XON_GU – Extended Composite Name and Identification Number for Organizations (Globally Unique)

Table 87 - XON_GU – Extended Composite Name and Identification Number for Organizations (Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Organization Name	ST	RE		
2	Organization Name Type Code		O		
3	ID Number		X		Excluded for this Implementation Guide.
4	Check Digit		O		
5	Check Digit Scheme		C(O/X)		Condition Predicate: If XON_GU.4 (Check Digit) is valued.
6	Assigning Authority	HD_GU	C(R/X)		Condition Predicate: If XON_GU.10 (Organization Identifier) is valued. The Assigning Authority component is used to identify the system, application, organization, etc. that assigned the value in XON_GU-10 (Organization Identifier).
7	Identifier Type Code	ID	C(R/X)	HL70203 (V2.7.1)	Condition Predicate: If XON_GU.10 (Organization Identifier) is valued.
8	Assigning Facility		O		
9	Name Representation Code		O		
10	Organization Identifier	ST	C(R/RE)		Condition Predicate: If XON_GU.1 (Organization Name) is not valued.

Usage Note

Both XON.1 and XON.10 may be populated, but at least one of them must be valued.

XON_NG – Extended Composite Name and Identification Number for Organizations (Non-Globally Unique)

Table 88 - XON_NG – Extended Composite Name and Identification Number for Organizations (Non-Globally Unique)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Organization Name	ST	RE		
2	Organization Name Type Code		O		
3	ID Number		X		Excluded for this Implementation Guide.
4	Check Digit		O		
5	Check Digit Scheme		C(O/X)		Condition Predicate: If XON_NG.4 is valued.
6	Assigning Authority	HD_NG	C(R/X)		Condition Predicate: If XON_NG.10 (Organization Identifier) is valued. The Assigning Authority component is used to identify the system, application, organization, etc. that assigned the value in XON_NG-10 (Organization Identifier).
7	Identifier Type Code	ID	C(R/X)	HL70203 (V2.7.1)	Condition Predicate: If XON_NG.10 (Organization Identifier) is valued.
8	Assigning Facility		O		
9	Name Representation Code		O		

SEQ	Component Name	DT	Usage	Value Set	Comments
10	Organization Identifier	ST	C(R/RE)		Condition Predicate: If XON_NG.1 (Organization Name) is not valued.

Usage Note

Both XON.1 and XON.10 may be populated, but at least one of them must be valued.

XON_IN1 – Extended Composite Name and Identification Number for Organizations (Name Only For Insurance)

Table 89 - XON_IN1 – Extended Composite Name and Identification Number for Organizations (Name Only For Insurance)

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Organization Name	ST	R		
2	Organization Name Type Code		O		
3	ID Number		X		Excluded for this Implementation Guide.
4	Check Digit		X		Excluded for this Implementation Guide.
5	Check Digit Scheme		X		Excluded for this Implementation Guide.
6	Assigning Authority		X		Excluded for this Implementation Guide.
7	Identifier Type Code		X		Excluded for this Implementation Guide.
8	Assigning Facility		X		Excluded for this Implementation Guide.
9	Name Representation Code		X		Excluded for this Implementation Guide.
10	Organization Identifier		X		Excluded for this Implementation Guide.

Usage Note

Data Type XON_IN1 is a specialization of the XON data type for the IN1 segment, specifically IN1-4 (Insurance Company Name). To avoid the duplication of information that can be messaged in the IN1-3 (Insurance Company ID) in the subcomponent of the data type (CX) that match subcomponents of the IN1-4 data type (XON), the XON data type for IN1-4 has been reduced to the XON.1 (Organization Name) and XON.2 (Organization Name Type Code) components which provide the unique information not provided in any other field's data component.

XPN – Extended Person Name

XPN – Extended Person Name - Base

Table 90 - XPN – Extended Person Name - Base

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Family Name	FN	RE		
2	Given Name	ST	RE		I.e., first name.
3	Second and Further Given Names or Initials Thereof	ST	C(RE/X)		Condition Predicate: If XPN-1 (Family Name) or XPN-2 (Given Name) is valued.
4	Suffix (e.g., JR or III)	ST	C(RE/X)		Condition Predicate: If XPN-1 (Family Name) or XPN-2 (Given Name) is valued.
5	Prefix (e.g., DR)		O		
6	Degree (e.g., MD)		X		Excluded for this Implementation Guide.
7	Name Type Code	ID	RE	HL70200	
8	Name Representation Code		O		
9	Name Context		O		
10	Name Validity Range		X		Excluded for this Implementation Guide.

SEQ	Component Name	DT	Usage	Value Set	Comments
11	Name Assembly Order		O		
12	Effective Date		O		
13	Expiration Date		O		
14	Professional Suffix		O		

XPN_1 – Extended Person Name 1

Table 91 - XPN_1 – Extended Person Name 1

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Family Name	FN	R		
2	Given Name	ST	C(R/X)		Condition Predicate: If XPN_1.1 (Family Name) is not valued ' "" '. I.e., first name.
3	Second and Further Given Names or Initials Thereof	ST	RE		
4	Suffix (e.g., JR or III)	ST	RE		
5	Prefix (e.g., DR)		O		
6	Degree (e.g., MD)		X		Excluded for this Implementation Guide.
7	Name Type Code	ID	C(R/X)	HL70200	Condition Predicate: If XPN_1.1 (Family Name) is not valued ' "" '.
8	Name Representation Code		O		
9	Name Context		O		
10	Name Validity Range		X		Excluded for this Implementation Guide.
11	Name Assembly Order		O		
12	Effective Date		O		
13	Expiration Date		O		
14	Professional Suffix		O		

Usage Note

Note that XPN_1 was developed for situations where the name cannot be unknown, therefore the value of XPN_1-7 (Name Type Code) disallows the use of the 'U' (Unknown) code value.

Conformance Statement: LOI Common Component

LOI-7: XPN_1-7 (Name Type Code) **SHALL NOT** be valued 'U'.

XTN – Extended Telecommunication Number

Table 92 - XTN – Extended Telecommunication Number

SEQ	Component Name	DT	Usage	Value Set	Comments
1	Telephone Number		X		Excluded for this Implementation Guide.
2	Telecommunication Use Code		O		
3	Telecommunication Equipment Type	ID	R	HL70202	
4	Email Address	ST	C(R/X)		Condition Predicate: If XTN-3 (Telecommunication Equipment Type) is valued 'X.400' or 'Internet'.
5	Country Code		O		
6	Area/City Code	NM	C(R/X)		Condition Predicate: If XTN-3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'SAT', 'FX', or 'TDD'.

7	Local Number	NM	C(R/X)	Condition Predicate: If XTN-3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'SAT', 'FX', or 'TDD'.
8	Extension	NM	C(RE/X)	Condition Predicate: If XTN-3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'SAT', 'FX', or 'TDD'.
9	Any Text		O	
10	Extension Prefix		O	
11	Speed Dial Code		O	
12	Unformatted Telephone number		C(O/X)	Condition Predicate: If XTN-3 (Telecommunication Equipment Type) is valued 'PH', 'CP', 'SAT', 'FX', or 'TDD'.

Usage Note

Components five through nine reiterate the basic function of the first component in a delimited form that allows the expression of both local and international telephone numbers. As of V2.3, the recommended form for the telephone number is to use the delimited form rather than the unstructured form supported by the first component (which is left in for backward compatibility only).

APPENDIX C - Additional Implementation Guidance – Other

I. CLINICAL LABORATORY IMPROVEMENT AMENDMENTS CONSIDERATIONS

In the United States, clinical laboratory testing of human specimens is regulated by the Clinical Laboratory Improvements Amendments of 1988 (CLIA). Several sections of the regulations implementing CLIA impact how electronic laboratory data is formatted for the US Realm and these are outlined in this section. Impacted areas include mandatory test request requirements.

II. MANDATORY ORDERING REQUIREMENTS

Section 493.1241 of the CLIA Regulations requires the laboratory to have a written or electronic request for patient testing from an authorized person, and defines items that must appear as part of a clinical laboratory test request (http://wwwn.cdc.gov/clia/regulatory/default.aspx). The laboratory may accept oral requests for laboratory tests if it solicits a written or electronic authorization within 30 days of the oral request and maintains the authorization or documentation of its efforts to obtain the authorization.

Interpretative guidelines on the elements required in a test requisition may be found at https://www.cms.gov/Regulations-and-Guidance/Legislation/CLIA/index.html

Specific fields impacted include the following:

Table 93 - Mandatory Test Request Requirements

Segment	Field	CLIA Requirement
PID-3 PID-5	Patient Identifier List Patient Name	The patient's name or unique patient identifier.
PID-7 PID-8	Date/Time of Birth Administrative Sex	The sex and age or date of birth of the patient.
OBR-16 ORC-12	Ordering Provider Ordering Provider	The name and address or other suitable identifiers of the authorized person requesting the test.
OBR-16 ORC-12	Ordering Provider Ordering Provider	The individual responsible for using the test results.
ORC-21 ORC-22 ORC-23	Ordering Facility Name Ordering Facility Address Ordering Facility Phone Number	The name and address of the laboratory submitting the specimen
ORC-14	Call Back Phone Number	Contact person to enable the reporting of imminently life threatening laboratory results or panic or alert values.
OBR-4	Universal Service Identifier	The test(s) to be performed.
OBX-5 (AoE, Prior Results)	Observation Value	For Pap smears, the patient's last menstrual period, and indication of whether the patient had a previous abnormal report, treatment, or biopsy.
SPM-4	Specimen Type	The source (type) of the specimen, when appropriate. See Section 2.5.15 SPM – Specimen Segment for vocabulary use.
SPM-17	Specimen Collection Date/Time	The date and, if appropriate, time of specimen collection.
OBR-13 OBX-5 (AoE, Prior Results) OBX-3	Relevant Clinical Information Observation Value Observation Identifier	Any additional information relevant and necessary for a specific test to ensure accurate and timely testing and reporting of results, including interpretation, if applicable.

III. REGULATORY COMPLIANCE

There may be local, state or federal regulations where the electronic message from an ordering provider is presumed to be the legal request for the tests performed. Hence, the receiver may be required to save the format or content of

the message for the same time period as required for any other legal document.

IV. AUTHORIZED PARTIES

Local laws, generally at the State level, govern who is authorized to order laboratory testing. CLIA restricts the availability of those authorized to order laboratory testing to just those approved at the local level and sets no national standards. Testing laboratories may not accept laboratory orders from unauthorized parties under CLIA.

Testing laboratories either have a trusted relationship with the ordering party or presume that the ordering party is authorized to order laboratory testing.

APPENDIX D - Component and Profile OIDS

Table 94 - Order Profile Components

Section	Name	OID
	LOI_Common_Component	2.16.840.1.113883.9.66
	LOI_GU_Component (Globally Unique)	2.16.840.1.113883.9.78
	LOI_NG_Component (Non-Globally Unique)	2.16.840.1.113883.9.79
	LAB_FI_Component	2.16.840.1.113883.9.80
	LAB_FRU_Component (Unique Filler Number)	2.16.840.1.113883.9.83
	LAB_FRN_Component (Non-Unique Placer Order Number)	2.16.840.1.113883.9.84
	LAB_PRU_Component (Unique Placer Order Number)	2.16.840.1.113883.9.82
	LAB_PRN_Component (Non-Unique Placer Order Number)	2.16.840.1.113883.9.81
	LAB_NB_Component (Newborn)	2.16.840.1.113883.9.24
	LAB_TO_Component (Time Offset)	2.16.840.1.113883.9.22
	LAB_XO_Component (Exclusions)	2.16.840.1.113883.9.23
	LOI_PH_Component (Public Health)	2.16.840.1.113883.9.94
	LOI_PR_Component (Prior Results)	2.16.840.1.113883.9.95
	LOI_RC_Component (Results Copies)	2.16.840.1.113883.9.96

Table 95 - Order Profiles (Pre-Coordinated Components)

Section	Name	OID
	LOI_GU_PRU_Profile	2.16.840.1.113883.9.85
	LOI_GU_PRN_Profile	2.16.840.1.113883.9.86
	LOI_NG_PRU_Profile	2.16.840.1.113883.9.87
	LOI_NG_PRN_Profile	2.16.840.1.113883.9.88

Table 96 - Response Components

Section	Name	OID
	LOI_Acknowledgement_Component	2.16.840.1.113883.9.89
	LOI_GU_Acknowledgement_Component	2.16.840.1.113883.9.90
	LOI_NG_Acknowledgement_ Component	2.16.840.1.113883.9.91

Table 97 - Response Profiles (Pre-Coordinated Components

Section	Name	OID
	LOI_GU_Response_Profile	2.16.840.1.113883.9.92
	LOI_NG_Response_Profile	2.16.840.1.113883.9.93

APPENDIX E - Glossary

Table 98 - Glossary

Term	Definition
Analyte	Component represented in the name of a measurable quantity. It is the most granular level at which measurements are made, and always represented using a single Observation segment group
Cancellation	Act of cancelling the order.
Electronic Health Record	Clinical information for a specific patient that is stored electronically within an EHR-S.
Electronic Health Record System (EHR-S)	This IG uses this term in the same context as stated in the "HL7 EHR System Functional Model White Paper" Section 4 Definitions (HL7 2004 www.hl7.org): "It is important to note that the DSTU does not attempt to establish another definition for EHR Systems, but chooses to utilize existing definitions that include the concept of EHR Systems as a system (at least one) or a system-of- systems that cooperatively meet the needs of the end user."
Future Order	A future order is an order with a start date/time where that start date/time indicates the earliest time the specimen can be collected.
Laboratory	A facility or organization that performs laboratory testing on specimens for the purpose of providing information for the diagnosis, prevention, treatment of disease or impairment, or assessment of health for humans.
Laboratory Information System (LIS)	An information system that receives, processes, and stores information related to laboratory processes. LIS may interface with HIS and EHR applications. This definition is very minimal and omits many features and capabilities that are typically associated with laboratory information systems. This minimal characterization is intentional, as to include the broadest possible set of LIS systems in the use case. The minimal nature of the definition by no means excludes LIS with significantly greater capabilities.
Laboratory Message	An electronic communication between a Laboratory Order System and a Laboratory Information System related to laboratory testing. Laboratory messages may be used to request that one or more tests be performed, to change previous requests for testing, to report the cancellation of requested tests, or to report the results of requested tests.
Laboratory Order	Synonymous with a Requisition when referring to a single ORC/OBR pair.
Laboratory Order System	Software, either stand-alone or as part of an EHR system, used by a Provider *(Order Placer)* to manage a laboratory order, including generating the laboratory requisition and sending it to a laboratory. Typically a laboratory order system is an integral part of an order management system that enables users to manage orders for many different types of services, procedures, supplies, etc. Since this guide only focuses on data exchange relative to laboratory orders it is purposely using a very limited definition.
Laboratory Requisition	A set of information that constitutes an official request for one or more laboratory tests to be performed on an individual patient. A laboratory requisition is specified in a clinical setting and communicated to a laboratory as a discrete paper or electronic artifact. Laboratory requisitions always include at least one test order. In terms of an HL7 order transaction, it represents one or more orders (ORC/OBR pairs) transmitted as part of the same OML^O21^OML_O21 new or append order message.
Newborn	The precise cutoff when a patient is considered a newborn or an infant is subject to interpretation, and this guide does not intend to provide a definitive answer to that. For further background the reader is directed to the following resources: • Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier; • World Health Organization – provides standardization for perinatal definitions; • Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation.
Orderable Test	A request to perform an individual test or panel. It always refers to a single ORC/OBR pair and may have one or more associated analytes (OBXs).

Panel	While there are differences in the meanings of the terms "panel" among various laboratories, for the purposes of this guide, it is defined as a grouping of procedures that measure multiple analytes from a single specimen (or multiple specimens in some cases) and can be requested through one laboratory order. This is also referred to as a battery. For example, a CBC or a urinalysis may be referred to as a panel.
Order Set	A set of laboratory orders that involve multiple tests and panels and that may require multiple specimens, but can be requested as a single unit for convenience. For example, a "diabetic order set profile" might include a CBC, a glycosylated hemoglobin test, and a urinalysis. The term "panel" is frequently used interchangeably with "order set", thus an order set profile that contains a variety of laboratory test orders that may be on its own or be combined with other test orders (e.g., radiology image, consult, etc.) can be considered an order set. Order sets shall not be communicated to the laboratory.
Request for Cancellation (RFC)	Request by the Provider *(Order Placer)* not to perform the order.
Test	A medical procedure or named set of related procedures that involves analyzing one analyte using a single sample of blood, urine, or other specimen from a patient for the purpose of diagnosing a disease or medical condition, planning or evaluating treatment, or monitoring the course of a disease.

APPENDIX F - Error Conditions and Related Codes

Table 99 – Error Conditions and Related Codes

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
100^Segment sequence error^HL70357	1001^Required segment missing	PID Segment	Used when PID Segment is not in message.	• Missing required segment		AR
100^Segment sequence error^HL70357	1001^Required segment missing	ORC Segment	Used when ORC Segment is not in message.	• Missing required segment		AR
100^Segment sequence error^HL70357	1001^Required segment missing	OBR Segment	Used when OBR Segment is not in message.	• Missing required segment		AR
100^Segment sequence error^HL70357	1002^Required group missing	SPECIMEN Segment	Used when SPM Segment is not in message.	• Missing required segment		AR
101^Required field missing^HL70357	LIMS-FR0706A	Processing ID	Used when MSH-11 is empty.	• Missing required field		AR
101^Required field missing^HL70357	LIMS-FR0705A	Version ID	Used when MSH-12 is empty.	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	PatientName	Used when PID-5 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	DateTimeOfBirth/Time/Year	Used when patient's DOB is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	AdministrativeSex	Used when PID-8 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	Relationship/Identifier	Used when NK1-3 is missing from the message	• Missing required field		AR

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
101^Required field missing^HL70357	1006^Required field missing	PatientClass	Used when PV1-2 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	FinancialClass/FinancialClassCode	Used when PV1-20 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	GuarantorName	Used when GT1-3 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	GuarantorAddress	Used when GT1-5 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	GuarantorRelationship	Used when GT1-11 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	GuarantorOrganizationName	Used when GT1-21 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	DateTimeOfTransaction/Time/Year	Used when ORC-9 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingProvider	Used when ORC-12, NPI is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingFacilityName	Used when ORC-21 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingFacilityAddress	Used when ORC-22 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingFacilityPhoneNumber	Used when ORC-23 is missing from the message	• Missing required field		AR

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
101^Required field missing^HL70357	1006^Required field missing	UniversalServiceIdentifier	Used when OBR-4 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingProvider	Used when OBR-16, NPI is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	Comment	Used when NTE-3 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	ActionCode	Used when PRT-2 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	Participation	Used when PRT-4 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	ParticipationPerson	Used when PRT-5 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	DiagnosisCode	Used when DG1-3 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	DiagnosisType	Used when DG1-6 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	ObservationIdentifier	Used when OBX-3 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	ObservationType	Used when OBX-29 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	SpecimenType	Used when SPM-4 is missing from the message	• Missing required field		AR

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
101^Required field missing^HL70357	1006^Required field missing	SpecimenCollectionDateTime	Used when SPM-17 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	ObservationDateTime/Time/Year	Used when OBR-7 is missing from the message	• Missing required field		AR
101^Required field missing^HL70357	1006^Required field missing	OrderingProvider/FamilyName/Surname	Used when ORC-12, Last Name is missing from the message	• Missing required field		AR
203^Unsupported processing ID ^HL70357	LIMS-FR0706B	Rejection: The processing ID is not supported	Used when MSH-11 includes a not supported processing ID.	• MSH-11 does not equal T or P		AR
203^Unsupported Version ID^HL70357	LIMS-FR0705B	Rejection: The Version ID is not supported	Used when MSH-12 includes a not supported version.	• MSH-12 does not equal 2.5.1		AR
200^Failed to parse message^HL70357		Rejection:	Used when MSH-9 includes a not supported Message type	• Rejection		
204^Unknown key identifier^HL70357	LIMS-FR081102A	OrderingProvider/IDNumber	Used when ORC-12 NPI field length is not equal to 10	• Invalid Ordering provider's NPI		AE
204^Unknown key identifier^HL70357	LIMS-FR081102C	OrderingProvider/IDNumber	Used when OBR-16 NPI field length is not equal to 10	• Invalid Ordering provider's NPI		AE
204^Unknown key identifier^HL70357	LIMS-FR0810	StarLIMS agency ID for Ordering Facility	Used when the StarLIMS agency ID is not in ORC-21.10	• Missing required field		AR
204^Unknown key identifier^HL70357	LIMS-FR081102A	Ordering Provider's NPI	Used when the Ordering Provider's NPI is not in ORC-12.1	• Missing required field • Ordering provider field length is not equal to 10		AE
204^Unknown key identifier^HL70357	LIMS-FR081102C	Ordering Provider's NPI	Used when the Ordering Provider's NPI is not in OBR-16.1	• Missing required field • Ordering provider field length is not equal to 10		AE

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
204^Unknown key identifier^HL70357	LIMS-FR081102B	Ordering Provider's NPI	Used when the Ordering Provider's NPI is not in ORC-12.1	• Missing required field • Ordering provider field length is not numeric		AE
204^Unknown key identifier^HL70357	LIMS-FR081102D	Ordering Provider's NPI	Used when the Ordering Provider's NPI is not in OBR-16.1	• Missing required field • Ordering provider field length is not numeric		AE
204^Unknown key identifier^HL70357	LIMS-FR081103	Ordering Provider's NPI	Used when the Ordering Provider's NPI not found in HPD	• Ordering Provider's NPI not found in HPD		AE
204^Unknown key identifier^HL70357	LIMS-FR081201A	StarLIMS Agency ID for Results Copies	Used when the StarLIMS agency ID is not in CC Provider's	• CC provider's StarLIMS Agency ID is not in the OML message		AE
207^Application internal error^HL70357	LIMS-FR020101-LOI-36	PlacerOrderNumber	Used when the Filler Order Number in OBR-2 must be identical to ORC-2 in the message	• Value not identical		AR
207^Application internal error^HL70357	LIMS-FR020101-LOI-37	FillerOrderNumber	Used when the Filler Order Number in OBR-3 must be identical to ORC-3 in the message	• Value not identical		
207^Application internal error^HL70357	LIMS-FR020101-LOI-38	OrderingProvider	Used when ORC-12 and OBR-16 must be identical in the message	• Value not identical		AR
207^Application internal error^HL70357	LIMS-FR020101-LOI-39	ParentUniversalServiceIdentifier	Used when the Filler Order Number in OBR-31 must be identical to ORC-31 in the message	• Value not identical		AR
207^Application internal error^HL70357	LIMS-FR020103 01B	Specimen Collection Date/Time is Prior to patient's DOB	Used in the case that the Specimen collection date/time in the message is prior to the patient's date of birth (DOB).	• Time Stamp Error		AR

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
207^Application internal error^HL70357	LIMS-FR02010302	Patient Date of Birth cannot be after the message receive date	Used in the case that the Patient's date of birth(DOB) in the message after the message Received date/time	• Time Stamp Error		AR
207^Application internal error^HL70357	LIMS-FR02010303	Observation Date/time cannot be after the message receive date	Used in the case that the observation date/time in the message is after the message Received date/time	• Time Stamp Error		AR
207^Application internal error^HL70357	LIMS-FR02010304	Observation EndDate/time cannot be after the message receive date	Used in the case that the observation enddate/time in the message is after the message Received date/time	• Time Stamp Error		AR
207^Application internal error^HL70357	LIMS-FR02010305	Date/time of Transaction cannot be after the message receive date	Used in the case that the date/time of transaction in the message is after the message Received date/time	• Time Stamp Error		AR
207^Application internal error^HL70357	LIMS-FR02010306B	ObservationDateTime/Time	Used when SPM-17 must be less than 60 days old in the message	• Time Stamp Error		AR
207^Application internal error^HL70357	LIMS-FR081201A	StarLIMS Agency ID for Results Copies	Used when the StarLIMS agency ID is not in CC Provider's	• CC provider's StarLIMS Agency ID is not in the OML message		AE
207^Application internal error^HL70357	LIMS-FR020101-LOI-50	No corresponding PRT-5 to OBR-28	Used when the OBR-28 must be identical to PRT-5 in the message	• Value not identical in the message		AR
900^Receiving system unresponsive^MIHINERR	FR0701	LIMS is down. Please retransmit in a few minutes	Used when the StarLIMS application is down or unresponsive.	•		AR

ERR-3	ERR-5	ERR-8	Error Condition	Likely causes	Reference	MSA-1
901^Receiving system down for maintenance^MIHINERR	FR0702	LIMS is down for maintenance. Please retransmit after February 24, 2016 4:00:00 PM EST	Used when the StarLIMS application is down for maintenance.	•		AR
951^Destination is unknown.^MIHINERR		MSH-5 and MSH-6	Used when Routing: The destination or receiving system is unknown.	• Rejection		AR
952^Not Authorized^MIHINERR	LIMS-FR080902	Unauthorized Submitter	Used when StarLIMS Agency ID not authorized to submit the messages	• Rejection: Invalid StarLIMS Agency ID		AR

Definitions

ERR-5 = From HL7 "Application specific code identifying the specific error that occurred." These are the StarLIMS Order application error codes and are only meaningful to the StarLIMS Order application technical team and would support troubleshooting as to why the message received AR/AE. They also help to uniquely identify the error condition.

ERR-8 = From HL7 "The text message to be displayed to the application user." These are additional "plain English" explanations of the error condition, and are included to support troubleshooting by the submitter.

MSA-1 = From HL7 "This field contains an acknowledgment code." These are to distinguish between "Non-Fatal Processing Errors" (AE) and "Fatal Processing Errors" (AR). "AE" messages are added to the StarLIMS Order application but are also flagged as errors. StarLIMS Order staff may contact the submitter to investigate "AE" messages. "AR" messages are NOT added to the StarLIMS Order application, and the submitter needs to correct the issue(s) and resubmit the message.

APPENDIX G – Sample Messages

New Order in the OML Message, with 1 ORC, 1 OBR and 1 SPM

MSH|^~\&|MDHHS-DataHub|MDHHS|LAN^23D0650909^CLIA|MDHHS^2.16.840.1.114222.4.3.2.2.3.161.1^ISO|20160308180405-0500||OML^O21^OML_O21|TC09SAPartAIG030101AA|T|2.5.1|||AL|AL|||||LOI_NG_PRN_Profile^^2.16.840.1.113883.9.88^ISO~LAB_FI_Component^^2.16.840.1.113883.9.80^ISO~LOI_PH_Component^^2.16.840.1.113883.9.94^I

SO~LAB_TO_Component^^2.16.840.1.113883.9.22^ISO~LOI_PR_Component^^2.16.840.1.113883.9.95^ISO
PID|1||MRNTC09SA-Part A||Shine^Baby Girl^^^^^L|Honey|20160308150405-0500|F||2106-3^white^HL70005|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA^H||^PRN^PH^^^586^3365555|^WPN^PH^^^586^3895631|||||||N^Not Hispanic or Latino^HL70189|||||||N|||||||
NK1|1|Shine^Sarah|MTH^Mother^HL70063|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|^PRN^PH^^^865^5551212||E^Employer^HL70131|||||||||||||||||||||||
IN1|1|NA|LHC|Lansing Health Care|30555^^Lansing^MI^48933|||IG030101|||Walmart^L||20171007150405-0500|||Shine^Sarah|CHD|19750627|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|||||||Y||||W|||||TC09SA-PartA
GT1|1||Shine^Sarah||123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|||19750627|||CHD|||||||||Walmart^L
ORC|NW|ORD723222^^2.16.840.1.113883.3.72.5.24^ISO|R-783274^^2.16.840.1.113883.3.72.5.25^ISO|GORD874211^^2.16.840.1.113883.3.72.5.24^ISO|||||20160308180405-0500|||8075000001^Smiles^Minnie^^^Dr^^^NPI||^WPN^PH^^^313^3456789|20160308150405-0500|^oral request confirmation^HL70119||||4|Detroit City Hospital^^^^^StarLIMS_Agency^^^^113115|2405 Garden St^^Detroit^MI^48201^USA|^WPN^PH^^^313^3456789|||||||VO^Voice
OBR|1|ORD723222^^2.16.840.1.113883.3.72.5.24^ISO|R-783274^^2.16.840.1.113883.3.72.5.25^ISO|6532-6^RabiesFA^LN|||20160308170551-0500|20160308180551-0500|||A||FNA Fasting not asked of the patient at time of procedure|||8075000001^Smiles^Minnie^^^Dr^^^NPI|^WPN^PH^^^313^3456789||||||||||8175000004^^^^^^^^StarLIMS~8175000005^^^^^^^^StarLIMS~8175000007^^^^^^^^StarLIMS~8175000010^^^^^^^^StarLIMS~8175000013^^^^^^^^StarLIMS|||RFS01^Diagnosis^BOL_0001
NTE|1||the sky is blue
PRT|1|AD||RCT|8175000004^^^^^^^^StarLIMS|||||||||7891 Money Ln^^Warren^MI^48089|^PRN^PH^^^586^4560987
PRT|2|AD||RCT|8175000005^^^^^^^^StarLIMS|||||||||8923 Miami St^^Sterling Heights^MI^48313|^PRN^PH^^^586^9081287
PRT|3|AD||RCT|8175000007^^^^^^^^StarLIMS|||||||||5643 Guitar Rd^^Lansing^MI^4893|^PRN^PH^^^517^7089087
PRT|4|AD||RCT|8175000010^^^^^^^^StarLIMS|||||||||6547 Drums St^^Flint^MI^48507|^PRN^PH^^^810^4502369
PRT|5|AD||RCT|8175000013^^^^^^^^StarLIMS|||||||||6712 Loli St^^Livonia^MI^48150|^PRN^PH^^^734^3127896
DG1|1|CE|V04.5^Vaccine for Rabbies^I9|||A|||||||||1
OBX|1|TS|AOE15^Date of Last Rabies Vaccination^BOL_0002||20150818060605-0500||||||O|||20160308100605-0500|||||||||||||||QST
SPM|1|4222||67922002^Serum^SCT||NONE|SWA|||||||||20160308170551-0500

New Order in the OML Message, with 1 ORC, 2 OBR's and 1 SPM

MSH|^~\&|MDHHS-

DataHub|MDHHS|LAN^23D0650909^CLIA|MDHHS^2.16.840.1.114222.4.3.2.2.3.161.1^ISO|20160309103205-0500||OML^O21^OML_O21|TC14IG030107AA|T|2.5.1|||AL|AL|||||LOI_NG_PRN_Profile^^2.16.840.1.113883.9.88^ISO~LAB_FI_Component^^2.16.840.1.113883.9.80^ISO~LOI_PH_Component^^2.16.840.1.113883.9.94^ISO~LAB_TO_Component^^2.16.840.1.113883.9.22^ISO~LOI_PR_Component^^2.16.840.1.113883.9.95^ISO
PID|1||MRNTC14||Old^Baby Girl^^^^^L|Shonal|20160223062705-0500|F||2106-3^white^HL70005|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA^H||^PRN^PH^^^586^3365555|^WPN^PH^^^586^3895631|||||||N^Not Hispanic or Latino^HL70189|||||||N|||||||
NK1|1|Shonal^Old|MTH^Mother^HL70063|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|^PRN^PH^^^865^5551212||E^Employer^HL70131|||||||||||||||||||||||||
IN1|1|NA|LHC|Lansing Health Care|30555^^Lansing^MI^48933|||FR080901|||Walmart^L||20171007150405-0500|||Shonal^Old|CHD|19750627|123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|||||||Y||||W|||||TC05SA
GT1|1||Shonal^Old||123 Main Street^Apartment 3-C^Oldtown^MI^48917^USA|||19750627|||CHD|||||||||Walmart^L
ORC|NW|ORD723222^^2.16.840.1.113883.3.72.5.24^ISO|R-783274^^2.16.840.1.113883.3.72.5.25^ISO|GORD874211^^2.16.840.1.113883.3.72.5.24^ISO|||||20160223093705-0500|||8075000001^Smiles^Minnie^^DR^^^^NPI||^WPN^PH^^^313^3456789|20160223094705-0500|^oral request confirmation^HL70119||||4|Detroit City Hospital^^^^^StarLIMS_Agency^^^^8175000005|2405 Garden St^^Detroit^MI^48201^USA|^WPN^PH^^^313^3456789|||||||VO^Voice
OBR|1|ORD723222^^2.16.840.1.113883.3.72.5.24^ISO|R-783274^^2.16.840.1.113883.3.72.5.25^ISO|1320^HIV Ag/Ab - Serum^L|||20160308103205-0500|20160308103205-0500|||A|||||8075000001^Smiles^Minnie^^DR^^^^NPI|^WPN^PH^^^555^1234567~^WPN^FX^^^555^2225555|||||||||||||
OBR|2|ORD723222^^2.16.840.1.113883.3.72.5.24^ISO|R-783274^^2.16.840.1.113883.3.72.5.25^ISO|1680^Syphilis (USR test)(1)^L|||20160308103205-0500|20160308103205-0500|||A|||||8075000001^Smiles^Minnie^^DR^^^^NPI|^WPN^PH^^^555^1234567~^WPN^FX^^^555^2225555|||||||||||||RFS01^Diagnosis^BOL_0001
NTE|1||the sky is blue
PRT|1|AD||RCT|8175000004^^^^^^^^StarLIMS|||||||||7891 Money Ln^^Warren^MI^48089|^PRN^PH^^^586^4560987
PRT|2|AD||RCT|8175000005^^^^^^^^StarLIMS|||||||||8923 Miami St^^Sterling Heights^MI^48313|^PRN^PH^^^586^9081287
PRT|3|AD||RCT|8175000007^^^^^^^^StarLIMS|||||||||5643 Guitar Rd^^Lansing^MI^4893|^PRN^PH^^^517^7089087
PRT|4|AD||RCT|8175000010^^^^^^^^StarLIMS|||||||||6547 Drums St^^Flint^MI^48507|^PRN^PH^^^810^4502369
PRT|5|AD||RCT|8175000013^^^^^^^^StarLIMS|||||||||6712 Loli St^^Livonia^MI^48150|^PRN^PH^^^734^3127896
OBX|1|ST|AOE25^Pregnancy^BOL_0002||NO||||||O|||20160308103205-0500|||||||||||||||QST
SPM|1|||119339001^Stool Specimen (Specimen)^SCT||NONE||||||||||20160308103205-0500

APPENDIX H - Revision History

Version	Date	Author	Comments
0.9	07/11/2016	J. Shaw	First draft released for “Pilot and Trial Implementations Only”

- END OF DOCUMENT -